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Redcliffe Area Traffic Study

Traffic Analysis Report

PREPARED FOR:
City of Belmont

March 2025

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REFRENCES:

1. Main Roads WA Operational Modelling Guidelines, Version 2.0, January 2021.
2. Austroads Guide to Traffic Management Part 8 (Local Area Traffic Management).
3. Main Roads WA Strategy and Implementation Framework, Low-Cost Urban Road Safety Program, May 2022; D22#24187
4. Liveable Neighbourhoods Guidelines, January 2009 Updated 02
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1 Executive Summary

The Redcliffe Area Traffic Study is a strategic initiative commissioned by the City of Belmont (The City) to thoroughly evaluate traffic flow in the Redcliffe area for the short, medium, and long term. The main goal of this project is to identify preferred network improvements that will implement necessary safety and amenity enhancements to better serve the community.

Transcore has been engaged by The City to conduct microsimulation transport modelling for this study. This advanced modelling technique allows for a detailed analysis of traffic patterns and behaviours under various conditions, enabling accurate predictions of how changes in land use and the road network might affect overall traffic flow.

To prepare for this modelling, Transcore, in collaboration with The City and Perth Airport, conducted extensive data collection and site observations. Understanding the value of community input, The City has actively sought feedback from residents, workers, and visitors to gain insights into their experiences in the area. This community feedback has been incorporated into the development of the microsimulation models, ensuring that the analysis addresses the needs and concerns of road users.

As part of this project, Transcore has engaged with key stakeholders, including Main Roads WA, the Department of Planning, Lands and Heritage (DPLH), Public Transport Authority (PTA) and Perth Airport. Utilizing the existing calibrated base case model, Transcore tested various scenarios and options aimed at redistributing traffic on local roads to improve safety and amenity for residents. The options explored fall into two categories:

- Network Change Options; and,
- Traffic Calming Measures.

The modelling scenarios tested under each option were informed by crash analysis results, site observations, and community feedback. The preferred modelling scenarios were chosen based on their effectiveness in reducing traffic volumes on local roads and enhancing safety and amenity for residents.

The following recommendations are proposed for short, medium, and long-term scenarios:

1.1 Short term recommendations:

Traffic modelling and analysis undertaken for the short-term scenario indicated that implementing the following modifications will provide same reduction in traffic volume on local roads and improved safety and amenity for residents. Therefore, the following modifications are recommended in the short term:

Stanton Road and Second Street:

- Raised platforms at Moreing Street and Lyall Street.
- Raised platform at Morrison Street with roundabout.
- Pedestrian crossing west of Lyall Street.
- Children crossing west of Morrison Street.
- Children crossing east of Kanowna Avenue.
- Reducing the speed limit for the section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) to 40 km/h.
- Left in/ Left out (LILO) treatment at Lyall Street/ Stanton Road as a trial.

- Investigate proposal of applying 40 km/h speed limit on Redcliffe area road network with associated traffic calming modifications.

In addition to the above modifications, Transcore suggests the following measures to be monitored and controlled to ensure the effectiveness of the proposed changes:

Speed compliance patrols: The section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) will be signposted at 40 km/h upon completion of the Low-Cost Urban Road Safety (LCURS) treatments. The City is encouraged to request the WA Police to have an active speed campaign along Stanton Road and Second Street.

Truck movement restrictions: All of the roads within the modelling study area (except western section of Dunreath Drive, Ben Street and Redcliffe Road which are RAV Tandem Drive 4) are classified as RAV Tandem Drive 1 which means that only "as of right" vehicles would be able to travel on these roads. Therefore, heavy vehicles longer than 19m are not permitted on all the other local roads. The City needs to monitor and raise any non-compliant movements with Main Roads WA for their action.

Bus movement from Depot to Redcliffe station: Advocacy to PTA for not using route via Ben Street, Great Eastern Highway (GEH), Coolgardie Avenue, First Street and Bulong Avenue for out of service movements.

Further, detailed investigations are required to address safety issues and confirm appropriate treatments at the following intersections:

- First Street/ Bulong Avenue;
- Victoria Street/ Moreing Street;
- Epsom Avenue/ Durban Street/ Stanton Road;
- Redcliffe Road/ Fauntleroy Avenue;
- Epsom Avenue/ Victoria Avenue;
- Second Street/ Kanowna Avenue; and,
- Morrison Street/Treffone Street/Ryans Court.

1.2 Medium term recommendations:

The following recommendations are proposed beyond 2032 (post Qantas terminal relocation) scenario:

- Traffic Monitoring: The City continue to monitor traffic volumes and crash records on local roads towards confirming future improvements.
- Investigate additional traffic calming measures: The City to ensure that the proposed traffic calming treatments (outlined for short term) implemented along Stanton Road and Second Street perform effectively. Additional traffic calming measures may be introduced on other local roads following the active traffic monitoring post Qantas terminal relocation.
- Active Transport Improvements: The following Active Transport proposals suggested by Perth Airport to be investigated and considered as part of the Sustainable Transport Strategy for The City:
    - Cycleway parallel with Tonkin Highway linking The Court/ Victoria Street North with Stanton Road.
    - Recreational Shared Path (RSP), Coolgardie Avenue, First Avenue and Victoria Street north.
    - RSP along old Brearley Avenue.
    - RSP along Stanton Road/ Second Street between Central Avenue and bridge over Tonkin Highway.
    - RSP along Dunreath Drive.
    - RSP along Fauntleroy Avenue.

- Optimisation of the GEH signalised intersections: In collaboration with Main Roads WA, The City advocate to improve traffic operations along GEH. This includes optimizing traffic signals, enhancing pedestrian crossings, and upgrading turning movements at signalised intersections in line with Main Roads WA's ultimate upgrade plans for the GEH.
- Public Transport Coordination: The City advocate to the PTA to synchronise bus and train timetables and schedules, and adjust bus frequency as necessary.
- Perth Airport West Precinct development: The City review developments in the Perth Airport West Precinct, ensuring that developments and relevant road network upgrades occur simultaneously to prevent congestion in the Redcliffe area.

1.3 Long term recommendations:

The following recommendations are proposed beyond 2041:

Further Upgrades on GEH:

- Advocate significant road upgrades to increase capacity on GEH, including additional lanes where feasible and the installation of dedicated turning lanes at critical intersections.

- Advocate for key intersection upgrades along GEH to improve traffic flow and reduce congestion, focusing on high-traffic intersections that currently experience bottlenecks.

Optimization of Traffic Signals:

- Advocate to Main Roads WA for a comprehensive review of the traffic signal timings on GEH to optimise flow, reduce delays, and minimise stop-and-go conditions. Implement adaptive traffic signal control systems that respond in real-time to traffic conditions.

Investigate Upgrades on Dunreath Drive and Fauntleroy Avenue:

- Advocate for further upgrades on Dunreath Drive and Fauntleroy Avenue to enhance capacity and improve safety. This could include widening, implementing dedicated bike lanes, and improving pedestrian facilities.

Enhance Active Transport Infrastructure:

- Work with State Government to develop and expand pedestrian and cycling infrastructure, including dedicated bike lanes, pedestrian pathways, and safe crossing points. Promote active transport options to reduce reliance on vehicles and encourage sustainable travel.

Improve Public Transport Services:

- Advocate and enhance public transport services by increasing the frequency and reliability of bus and train services. Consider implementing new routes or expanding existing ones to better serve the community and reduce traffic congestion.

Investigate accessibility to GEH from Redcliffe Station Precinct:

- Advocate for State Government to investigate direct access to GEH and Central Avenue.

2 Introduction

Transcore has been commissioned by The City to undertake microsimulation traffic modelling and analysis for the Redcliffe area, focusing on existing (2024), medium-term (2032), and long-term (2041) scenarios.

Transcore prepared three different traffic reports for this study:

- Existing Situation Report;
- Calibration and Validation Report; and,
- Traffic Analysis Report.

This "Traffic Analysis Report" aims to document the assumptions, methodology, and outcomes of the assessments conducted for the short, medium, and long-term scenarios.

As part of this project, Transcore has conducted extensive data collection and site observations in collaboration with The City and Perth Airport. This data was essential for calibrating the base case model, ensuring that the analysis is based on accurate information.

A Traffic Report was prepared for the "Existing Situation", documenting the collected data, existing road network details, and other pertinent information used as inputs for the microsimulation models. This "Traffic Analysis Report" also includes insights from Transcore's site visits and community feedback, providing a comprehensive overview of the current traffic conditions in Redcliffe.

Transcore has also prepared a separate report titled "Calibration and Validation Report." The data from the Traffic Report for the "Existing Situation Report" was used in calibrating and validating the base case model.

2.1 Modelling Study Area

The modelling study area is shown in Figure 1. The study area includes major distributor roads and the majority of the local access streets within Redcliffe area, highlighting critical intersections and access points that influence traffic flow. It extends to key adjacent areas within Belmont, ensuring a comprehensive understanding of how traffic in Redcliffe interacts with the broader regional road network.

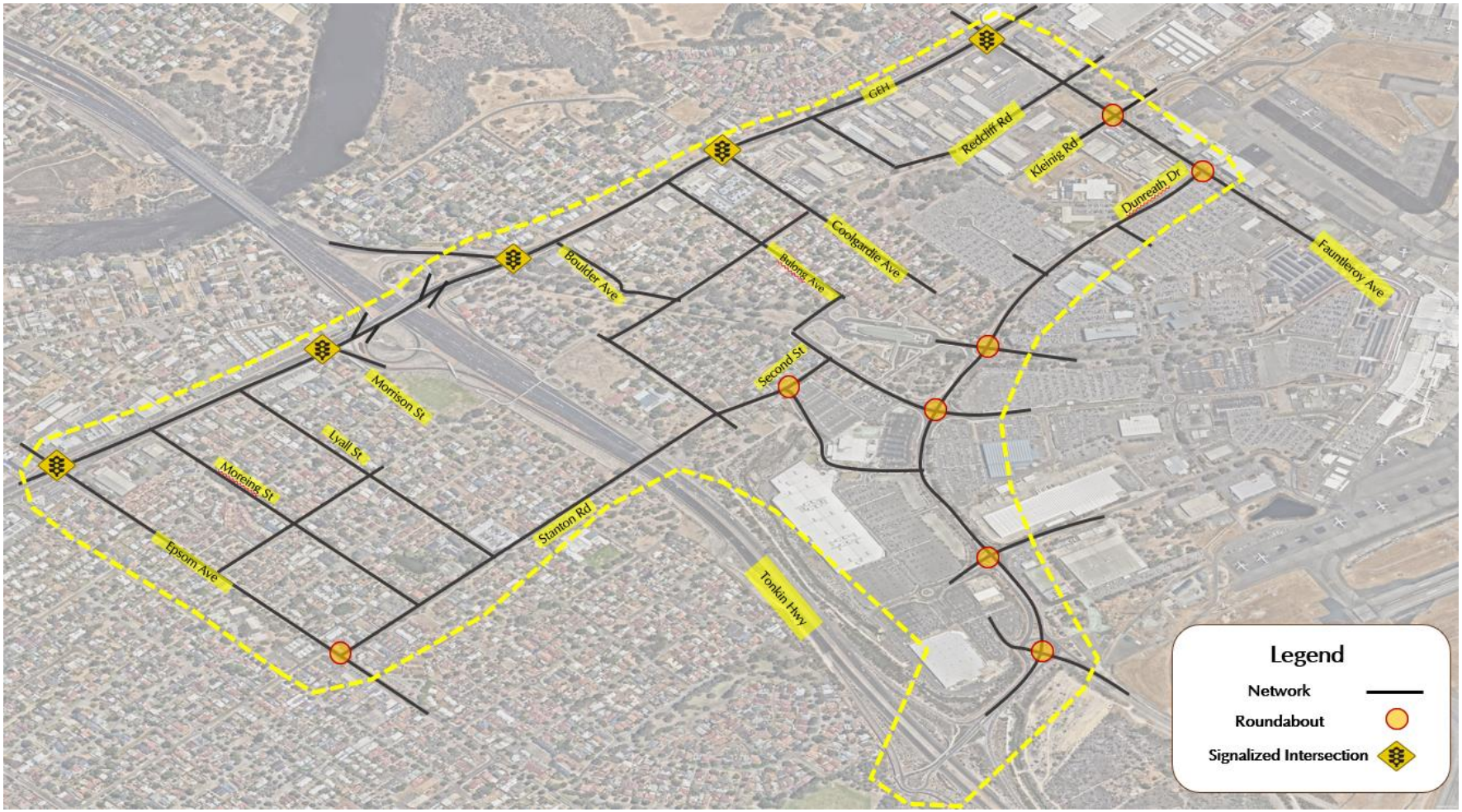

Figure 1: Modelling study area, key roads

3 Existing Situation

3.1 Data Collection

Developing a calibrated base case model necessitates a thorough understanding of the existing traffic patterns within the modelling study area. Given the Redcliffe area's proximity to Perth Airport and regional roads such as Tonkin Highway and GEH, the existing traffic within the modelling study area includes local traffic, regional traffic, and airport-related traffic.

To establish the existing traffic patterns and peak hours for modelling and analysis, extensive data collection, site observations, and community engagement were conducted. This section of the report provides a brief overview of the efforts undertaken to investigate the current situation.

3.1.1 Traffic counts

As part of the Redcliffe Area Traffic Study, video traffic counts were organised by The City and Perth Airport on Thursday, 23 May 2024. Additionally, The City supplied the latest Sydney Coordinated Adaptive Traffic System (SCATS) data (sourced from Main Roads WA) for all signalised intersections within the modelling area, also corresponding to the same date.

3.1.2 Signal Data (SCATS)

The SCATS history files for the nominated peak hours were sourced from Main Roads WA for signalised intersections for Thursday, 23 May 2024. This data is crucial for understanding the operational characteristics of traffic signals during the peak hours.

3.1.3 *Speed limits*

Most roads have a speed limit of 50 km/h, while GEH and Dunreath Drive have a higher speed limit of 60 km/h.

In proximity to Redcliffe Primary School and St Maria Goretti Primary School, a school zone speed limit of 40 km/h is in effect along sections of Kanowna Avenue and Stanton Road during the AM modelled peak hour (8:00-9:00). The PM modelled peak hour (4:00-5:00) would not be affected by the school zone speed limit. There are a number of existing traffic calming measures with advisory speed limits within the modelling study area which has been considered and coded in the base case model.

3.1.4 Existing Queue Length

Queue lengths at the start of the green time for every movement/lane were observed and recorded for signalised intersections. Queue lengths also were collected for key unsignalised intersections. The collected queue data was used to calibrate and validate the base case models.

3.1.5 Observed Travel Times

Vehicle travel times on the following routes within the modelling study area were collected:

- GEH;
- Fauntleroy Avenue/ Dunreath Drive; and,
- Central Avenue/Second Street/ Stanton Road/ Epsom Avenue.

Travel times were recorded for both directions on roads during the peak hours and used for calibration and validation of the base case models.

3.1.6 Public Transport

The existing public transport routes, bus stops, and the time table for each bus stop during the nominated peak hours were collected and coded in the existing base case models.

3.1.7 Crash Analysis

To identify hazardous intersections within the modelling study area, the Main Roads WA crash analysis tool was utilised. Intersections with more than four reported crashes in the five-year period from 2019 to 2023 were filtered for analysis. Figure 2 illustrates the results of this crash analysis.

Most hazardous intersections are situated along busier roads, including GEH, Dunreath Drive, Fauntleroy Avenue, Stanton Road, and Epsom Avenue. Notably, the following intersections within local roads reported to have at least four reported crashes:

- First Street/Bulong Avenue (4 crashes);
- Victoria Street/Moreing Street (5 crashes);
- Lyall Street/Stanton Road (6 crashes);
- Epsom Avenue/Durban Street (6 crashes);
- Redcliffe Road/Fauntleroy Avenue (14 crashes);
- Epsom Avenue/ Stanton Road (4 crashes);
- Epsom Avenue/ Victoria Street (4 crashes);
- Second Street/ Kanowna Avenue (4 crashes); and,
- Second Street/ Boulder Avenue (5 crashes).

These findings highlight areas that may require targeted safety improvements and traffic management interventions.

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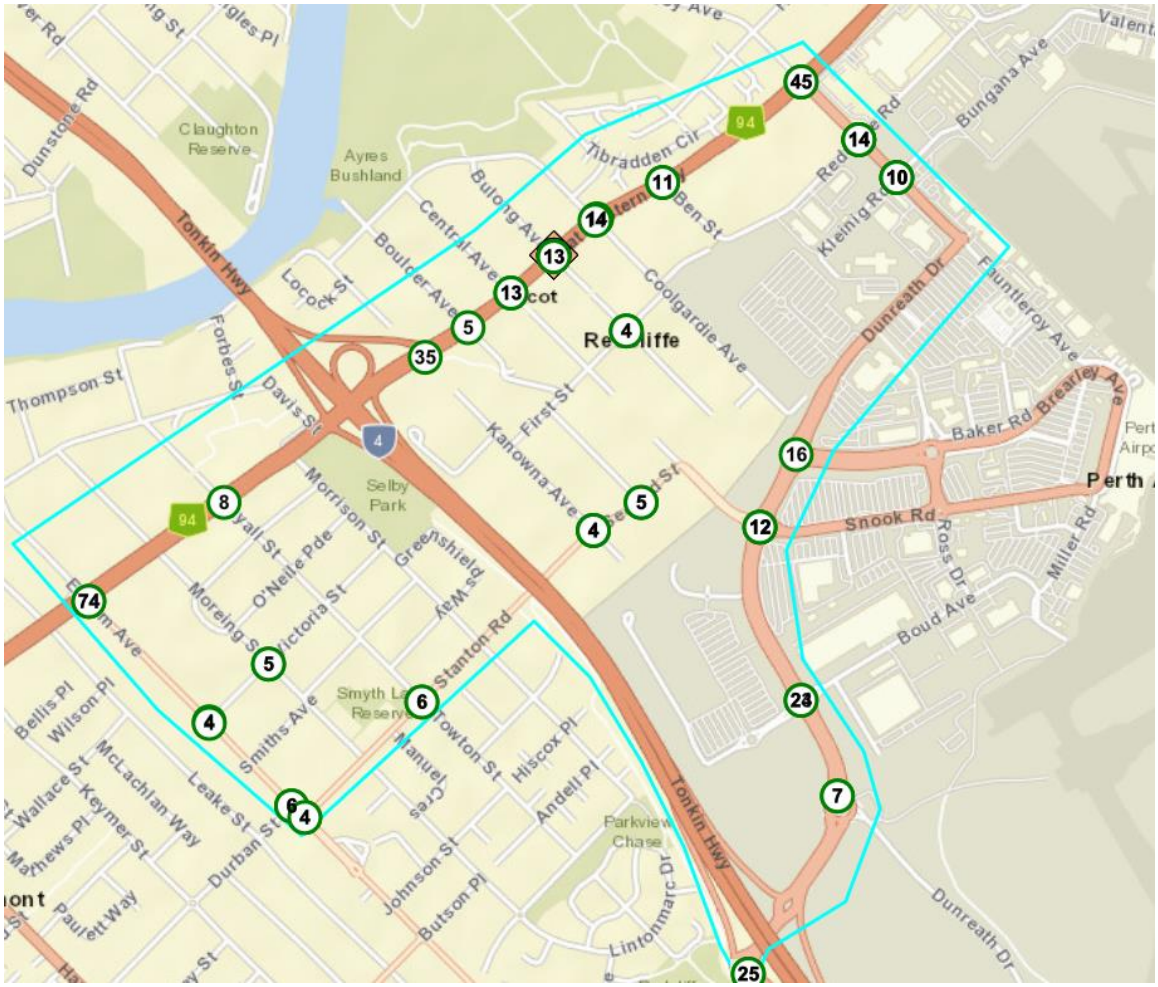


Figure 2: key intersections within the modelling study area with more than 4 crashes between 2019 and 2023

3.1.8 Community Feedback

Recognizing the significance of community input, The City proactively engaged residents, workers, and visitors to gain insights into their experiences in the Redcliffe area. This engagement process involved various methods, including a mapping tool and a survey, which allowed community members to identify specific locations of concern and share their observations.

Additionally, drop-in sessions held on July 25 and 28, 2024, provided opportunities for direct interaction, enabling participants to voice their concerns and suggestions in person.

A total of 264 participants completed the survey, either online or in person. The feedback collected highlighted several critical traffic issues including:

- Congestion due to excessive traffic volumes;

- Through traffic (or "rat running");
- Speeding; and,
- Safety concerns for all road users on local roads.

Below are the locations with the most feedback:
Location 1: Stanton Road

Location 2: Central Avenue

Location 3: Morrison Street

Location 4: Lyall Street

Location 5: GEH

Location 6: Epsom Avenue

The insights gathered from community feedback were helpful in identifying key traffic concerns and shaping the development of option testing modelling scenarios. By analysing the most frequently mentioned issues and locations, The City was able to prioritise areas requiring immediate attention. This feedback informed the modelling scenarios by:

- Targeting Key Areas: The locations with the highest concentration of comments were prioritised for modelling, ensuring that the most significant community concerns were addressed.
- Identifying Common Themes: The recurring issues—such as congestion, safety, and "rat running"—guided the development of specific scenarios aimed at alleviating these problems.
- Consideration of Community Comments: Many suggested solutions from community members were considered in the modelling process, allowing for a collaborative approach to traffic management.
- Testing Potential Interventions: Modelling scenarios to evaluate the effectiveness of proposed interventions.

3.2 Observations of Existing Situation

Based on site visits, data review, crash analysis and community feedback, the following key observations have been made regarding the current traffic situation in the Redcliffe area:

- **Through Traffic on local roads**: The proximity of the Redcliffe area to Perth Airport and new commercial developments, such as Costco and Direct Factory Outlet (DFO), has led to significant through traffic (mainly relevant to Perth Airport) on local roads, particularly Stanton Road and Second Street, with lesser impacts on Central Avenue, Bulong Avenue, First Street, and Coolgardie Avenue.
- **Over utilisation of Stanton Road**: Stanton Road features a 7m carriageway and an average 20m road reserve and would be classified as local distributor with upper threshold of 6,000 vehicles per day (vpd) in Main Roads WA Road hierarchy map. Traffic volumes on Stanton Road (at the bridge) are approximately 14,000 vpd. This volume exceeds the typical capacity for a local distributor Road.
- **Capacity of Main Distributor Roads**: The main distributor roads, GEH and Dunreath Drive, are operating at capacity during peak hours. This congestion affects the effectiveness of existing traffic calming measures on Stanton Road and surrounding local roads.
- **Insufficient/ ineffective Traffic Calming Measures**: While some traffic calming measures are in place along Stanton Road and other local roads like Lyall Street and Moreing Street, these measures are either insufficient or ineffective in deterring through traffic.
- **Safety**: Safety issues related to the intersections of:
    - First Street/Bulong Avenue;
    - Victoria Street/Moreing Street;
    - Lyall Street/Stanton Road;
    - Epsom Avenue/Durban Street;
    - Redcliffe Road/Fauntleroy Avenue;
    - Epsom Avenue/ Stanton Road;
    - Epsom Avenue/ Victoria Street;
    - Second Street/ Kanowna Avenue; and,
    - Second Street/ Boulder Avenue.
- **Signal Optimisation**: A lack of signal optimisation and coordination along GEH.
- **Traffic Congestion**: Notable congestion on GEH, Stanton Road, Central Avenue, Fauntleroy Avenue and Epsom Avenue.
- **Pedestrian Safety**: Concerns regarding pedestrian safety along GEH, Stanton Road, Coolgardie Avenue, Central Avenue, Dunreath Drive, Boulder Avenue, and Bulong Avenue.

4 Base Case Model

4.1 Model Calibration

4.1.1 *Existing Base Case Models*

The existing AM and PM peak hour models were built for 8:00 – 9:00 am and 4:00 – 5:00 pm periods respectively. For the base case "warm up" and "cool down" periods of 15 minutes were introduced to populate all road links prior to and after the model period. The microsimulation model (for existing and future scenarios) was developed in accordance with Main Roads WA Operational Modelling Guidelines.

4.1.2 *Vehicle Types*

The demand matrices were established using the Austroads Vehicle Classification System in accordance with Table 5.1 of Main Roads WA Operational Modelling Guidelines. The desired heavy vehicle acceleration values were adopted using the values provided in Table 5-2 of Main Roads WA Operational Modelling Guidelines. The recommended power and weight for different vehicle types were adjusted using the values in Table 5.3 of the Main Roads WA Operational Modelling Guidelines.

The network coding, priority rules and conflict areas were coded in accordance with the recommendations of Main Roads WA Operational Modelling Guidelines.

4.1.3 *Link Volumes and Turn Counts*

The observed and modelled link volumes and turn counts were compared for the key roads and intersections within the modelling study area. The GEH[1] value was used for checking the appropriateness of the calibrated base case models ensuring that 85% of the data in the base case model should have a GEH less than 5.0.

4.2 Model Validation

4.2.1 Queue Lengths

During the calibration process, the maximum queue lengths were observed in the model and compared to queue length information collected from on-site observations to ensure the modelled queues are in the correct order of magnitude for both AM and PM peak hours which confirms satisfactory validation of the base case model.

[1] The GEH Statistic is a formula used in traffic engineering, and traffic modelling to compare two sets of traffic volumes. The GEH formula gets its name from Geoffrey E. Havers.

4.2.2 Travel Times

In VISSIM[2], travel time is integral to the traffic assignment process, which distributes and assigns traffic across the network based on various dynamic factors. The software calculates the travel time for each road segment, or link, by considering several elements, such as the actual speed of vehicles, traffic flow, road capacity, and delays caused by queueing. This calculation reflects the real-time conditions on the road, taking into account how congestion and signal timing can affect travel times. For instance, if a road segment experiences heavy traffic, the speed will decrease, leading to longer travel times, which in turn influences how vehicles are assigned to different routes.

Additionally, VISSIM employs a dynamic traffic assignment approach that continuously updates travel times as conditions change. As vehicles traverse the network, factors like vehicle density and the presence of bottlenecks such as temporary traffic management on roads can alter the travel times on various links. When a bottleneck or traffic incident occurs, travel times on affected routes increase, prompting vehicles to reroute to less congested alternatives. Moreover, the impact of traffic signal control plays a significant role, particularly in urban environments where coordinated signals can optimise flow but also affect the overall travel time experienced by vehicles. This real-time adaptability allows VISSIM to simulate traffic behaviour accurately, reflecting the complexities of urban traffic dynamics.

In order to validate the base case model against travel time, the recorded vehicle travel times against the modelled travel times during the AM and PM peak hours were reviewed for main routes within the modelling study area to ensure the calibrated base case model reasonably predicts the observed travel times for the key roads within the modelling study area.

Overall, the calibrated base case models produced results that were well aligned to observed values for AM and PM peak period conditions. For the calibration and validation analysis, all of the available data was used; no data has been omitted or removed because of a poor fit.

Therefore, the base case models were considered to be sufficiently accurate for developing the future models or testing various network changes.

[2] Verkehr In Städten - SIMulations modell (German for "Traffic in cities - simulation model")

5 Scenario Modelling Considerations – Short Term

Site observations, supported by the calibrated base case model and community feedback, have revealed significant through traffic on Stanton Road and Second Street, leading to congestion and safety concerns, as confirmed by crash analysis at key intersections along these routes.

The review of the calibrated base case model indicates that approximately 50% of the traffic on Stanton Road and Second Street is attributed to Perth Airport traffic during peak hours, with either the origin or destination being within the airport.

In response, it is recommended that The City explore both short-term and long-term strategies to alleviate these issues. Recent changes in Jetstar flight operations at Perth Airport, followed by the planned relocation of Qantas flights around 2032, may provide medium-term relief, but further solutions must be investigated and implemented to address the ongoing challenges.

Transcore utilised the existing calibrated base case model to test various scenarios and options aimed at redistributing traffic on local roads to enhance safety and amenity for residents. The options tested fell into two categories:

1. Network Change Options, and,
2. Traffic Calming Measures.

The modelling scenarios tested under each option were developed based on the results of the crash analysis, site observations and review of the community feedback.

This section of the report will review and document the outcomes of the modelling scenarios conducted for the existing situation using the calibrated base case model (2024 model).

5.1 Network change options

The network change option reflects the potential changes to the road network that may result in detracting the Perth Airport traffic from local roads (in particular Stanton Road and Second Street) for improving traffic operation, safety and local living amenity. The key network change options that were tested in the model were:

1. LILO treatment at Lyall Street/ Stanton Road;
2. Cul-de-sac closure at Bulong Avenue/ Boorn Street; and,
3. Closure of Central Avenue.
4. Closure of Stanton bridge.
5. Closure of Moreing Street, Lyall Street and Boulder Avenue at GEH.

5.1.1 LILO treatment at Lyall Street/ Stanton Road

Site observations and traffic modelling indicate during PM peak hours there is significant through traffic on Lyall Street, particularly during PM peak hours. The current right turn movement from Stanton Road to Lyall Street is approximately 76 vehicles per hour (vph) in the AM and 167 vph in the PM, leading to long queues on Stanton Road, especially during the PM peak. One potential solution to manage traffic on Lyall Street is to downgrade the intersection of Lyall Street and Stanton Road to a left in/left out configuration. While traffic calming measures, such as slow points, are currently in place on Lyall Street, they have proven ineffective in deterring through traffic during the peak hours.

Traffic modelling and analysis undertaken indicates that downgrading the intersection of Lyall Street and Stanton Road to a LILO configuration would redistribute the majority of the right in/ right out movements at the intersection to Moreing Street with lesser extent to Epsom Avenue and Boulder Avenue as shown in Figure 3. According to this figure 100% of the right turn movements out of Lyall Street into Stanton Road would shift to Moreing Street. 40% of the right-in movements from Stanton Road to Lyall Street would shift to Moreing Street and the balance would be redistributed to Boulder Avenue.

The maximum queue on Stanton Road at the Moreing Street intersection is also detailed in Figure 3. The maximum queue on Stanton Road shown at Moreing Street intersection is less than the observed queue at Lyall Street in the current situation.

In order to establish the impact of the proposed LILO configuration at Lyall Street intersection, the traffic change on the existing road network were reviewed and the traffic change on most affected roads were reported in Table 1 and explained below:

In the morning (8:00-9:00 am) period, Lyall Street experiences a substantial decrease in traffic, from 156 vph without treatment to just 50 with the proposed changes, resulting in a reduction of 106 vph or 68%. Conversely, Moreing Street sees an increase from 106 to 137 vph, a rise of 31 vph or 29%. Other roads such as Stanton Road and Epsom Avenue also show minor increases, indicating a shift in traffic patterns due to the proposed configuration.

In the afternoon (4:00-5:00 pm) period, the trend continues with Lyall Street showing a remarkable decline in traffic from 241 vph to 45, a reduction of 196 vph or 81%. Moreing Street again experiences a significant increase, rising from 96 to 181 vph, illustrating an 89% increase. Other roads also reflect changes, with Stanton Road showing a slight decrease and Epsom Avenue indicating a moderate rise.

Overall Findings:
The LILO configuration at Lyall Street effectively reduces traffic at the intersection and Lyall Street with redistributing the traffic to other streets, with Moreing Street and Boulder Avenue seeing the most significant increases. However, the existing standard of Moreing Street and Boulder Avenue would be able to accommodate the additional traffic and the traffic impact of this modification would not undermine traffic operation or safety of the other roads.

According to the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines (2016), an increase in traffic flow of less than 100 vph is generally deemed insignificant.

This means that although some roads, such as Moreing Street and Epsom Avenue, may see a rise in vehicle numbers as traffic redistributes due to the new configuration at Lyall Street intersection/ Stanton Road, these increases are not expected to cause significant congestion or operational issues.

The assessment aligns with the guidelines that suggest any road section experiencing an increase greater than 100 vph should be analysed further. Since the proposed changes result in increases that remain below this threshold, it can be concluded that the overall traffic impact on the surrounding road network will remain manageable and not materially affect road performance.

However, the redistribution of traffic resulting from the proposed LILO on Lyall Street would not adversely affect the traffic operations of adjacent roads. It is recommended that this initiative be implemented as a trial measure, with traffic movements monitored after the conversion. If it proves effective in managing traffic flow and reducing congestion, it may be considered for permanent implementation.

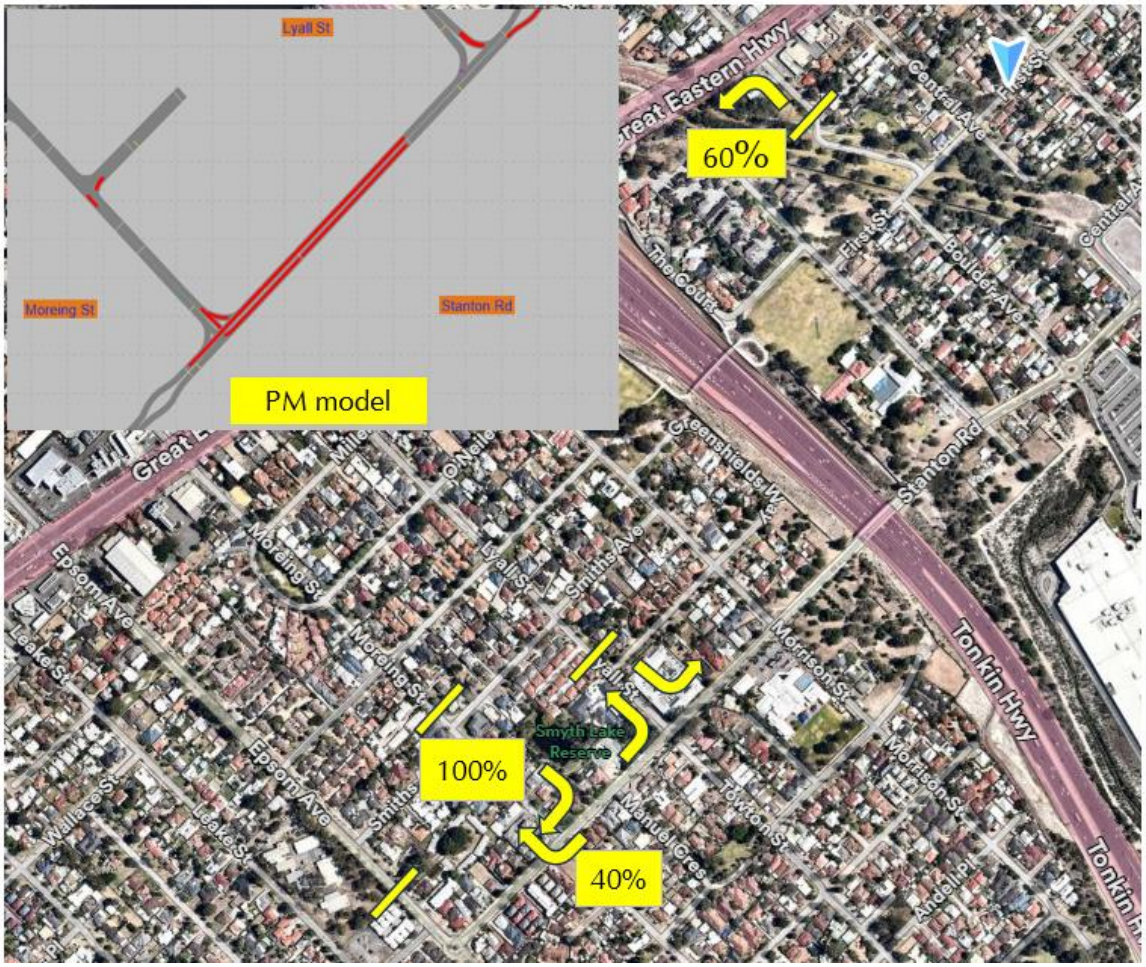


Figure 3: Model outputs for LILO treatment at Lyall Street/ Stanton Road

Table 1: Model outputs for LILO treatment at Lyall Street/ Stanton Road

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Lyall St	156	50	-106	-68%
	Moreing St	106	137	31	29%
	Stanton Rd (East of Lyall St)	872	910	38	4%
	Epsom Ave (South of Durban St)	910	991	81	9%
	Morrison St	40	45	5	13%
	Boulder Ave	66	69	3	5%
PM	Lyall St	241	45	-196	-81%
	Moreing St	96	181	85	89%
	Stanton Rd (East of Lyall St)	1054	987	-67	-6%
	Epsom Ave (South of Durban St)	960	1028	68	7%
	Morrison St	46	50	4	9%
	Boulder Ave	80	140	60	75%

5.1.2 Cul – de – sac closure at Bulong Avenue/ Boorn Street

Site observations, information obtained from The City, review of the community feedback and crash history at the intersection of First Street/ Boulder Avenue indicated safety concerns at this intersection which would need further investigations to address the crashes that impact the community.

Further, the out of service buses from Redcliffe Station use Central Avenue, Bon Street, Bulong Avenue, First Street, Coolgardie Avenue, GEH and Ben Street to access the bus depot which is located near the intersection of Redcliffe Road/ Fauntleroy Avenue as shown in red route in Figure 4. Currently the buses avoid right turn from Redcliffe Road to Fauntleroy Avenue due to the congestion, excessive delay and turning conditions for buses to navigate this intersection. Therefore, the buses instead of using the blue route in Figure 4 would prefer to use the red route which require navigating the intersection of Bulong Avenue/ First Street.

This intersection is tight for lane correct turning movement of buses and trucks and has been identified as a hazardous intersection due to the number of crashes that has been reported at this intersection. The proposed modifications would encourage the buses to avoid this route and instead opt to turn left from Central Avenue towards Dunreath Drive to access Fauntleroy Avenue and the bus depot as shown in blue route in Figure 4.

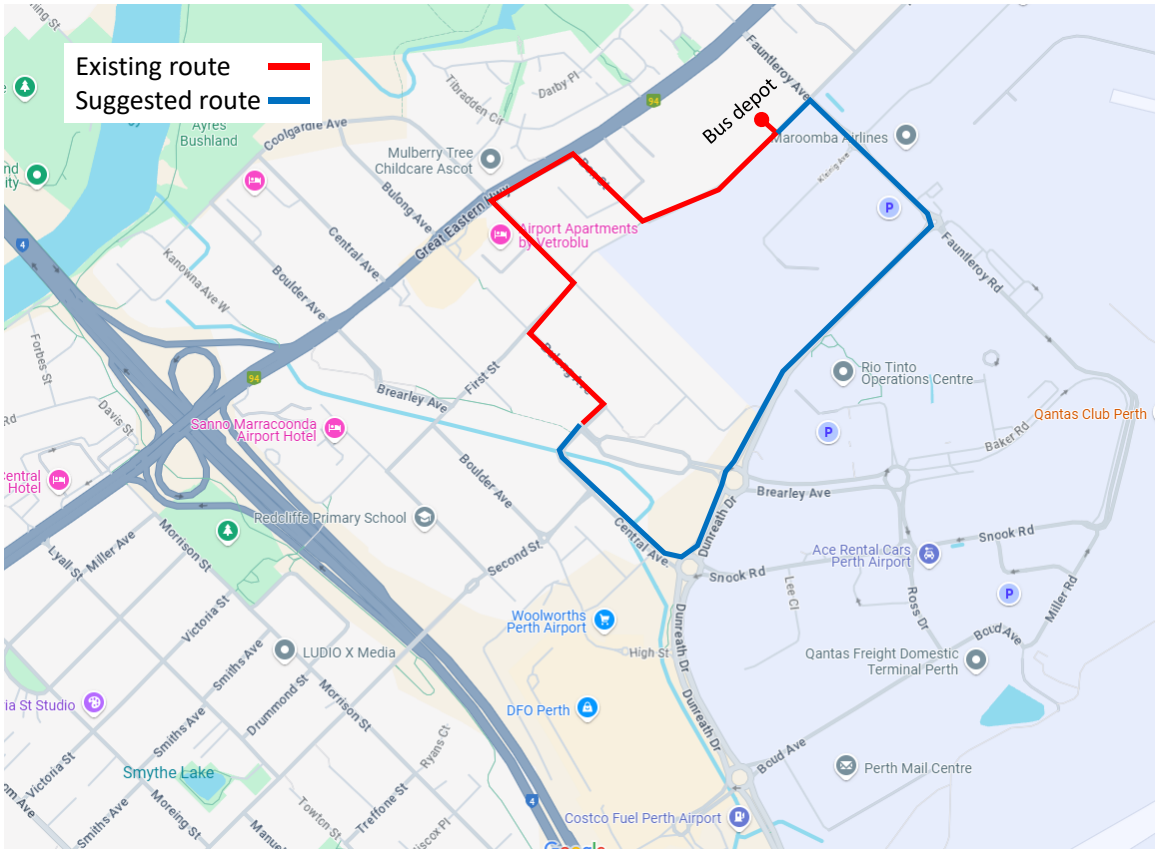


Figure 4: Existing and proposed routes to depot for the buses that are not in service

The preferred response is to improve turning conditions for buses and other traffic at the intersection of Redcliffe Road/Fauntleroy Avenue. Therefore, advocacy with PTA is required to ensure buses do not take the red route.

Transcore has coded the proposed modifications at the 2024 calibrated base case model to assess the traffic impact of the proposal.

Implementing the cul-de-sac closure at the Bulong Avenue and Boorn Street intersection is expected to significantly redistribute traffic patterns in the area during the AM and PM peak hours (refer Table 2).

In the morning (8:00-9:00 am) period, Bulong Avenue experiences a substantial decrease in traffic from 117 vph without treatment to just 27 with the closure, representing a reduction of 90 vph or 77%. This significant drop indicates that the cul-de-sac closure effectively removes through traffic from Bulong Avenue, redirecting vehicles to alternative routes. Concurrently, roads like Fauntleroy Avenue show an increase of 45 vehicles or 8%, suggesting that some of the diverted traffic is being absorbed by this road. Boulder Avenue also sees a slight decrease in traffic, while First Street experiences a notable reduction of 45 vehicles or 25%, indicating a redistribution of traffic away from these routes as well.

In the afternoon (4:00-5:00 pm) period, the impact of the cul-de-sac closure is even more pronounced. Bulong Avenue traffic drops from 127 vph to 25, a decrease of

102 vph or 80%. Conversely, Boulder Avenue experiences a significant increase of 98 vph or 89%, while First Street sees an increase of 77 vph or 67%.

Figure 5 illustrates the VISSIM modelling outputs during the PM peak hour (4:00-5:00). As evident, long queues and delays are expected at the roundabout intersection of Second Street/ Boulder Avenue during the PM peak hour. It should be noted that in the afternoon Fauntleroy Avenue is busy and as a result it is less attractive for redistribution of the traffic (refer Figure 6 for AM ad PM preferred routes).

Figure 5: VISSIM modelling output for Cul-de-sac closure at Bulong Avenue/ Boorn Street

Table 2: VISSIM output for Cul-de-sac closure at Bulong Avenue/ Boorn Street

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Second St	685	683	-2	0%
	Boulder Ave	132	114	-18	-14%
	Bulong Ave	117	27	-90	-77%
	First St	180	135	-45	-25%
	Fauntleroy Ave	568	613	45	8%
PM	Second St	900	965	65	7%
	Boulder Ave	110	208	98	89%
	Bulong Ave	127	25	-102	-80%
	First St	115	192	77	67%
	Fauntleroy Ave	715	717	2	0%

Overall Findings:

The proposed Cul-de-sac closure at Bulong Avenue/Boorn Street would redirect existing traffic to other local roads, particularly First Street and Boulder Avenue. Furthermore, significant queues and delays are expected at the roundabout intersection of Second Street/ Boulder Avenue/ High Street. Therefore, the proposed Cul-de-sac closure at Bulong Avenue/Boorn Street is not favoured.

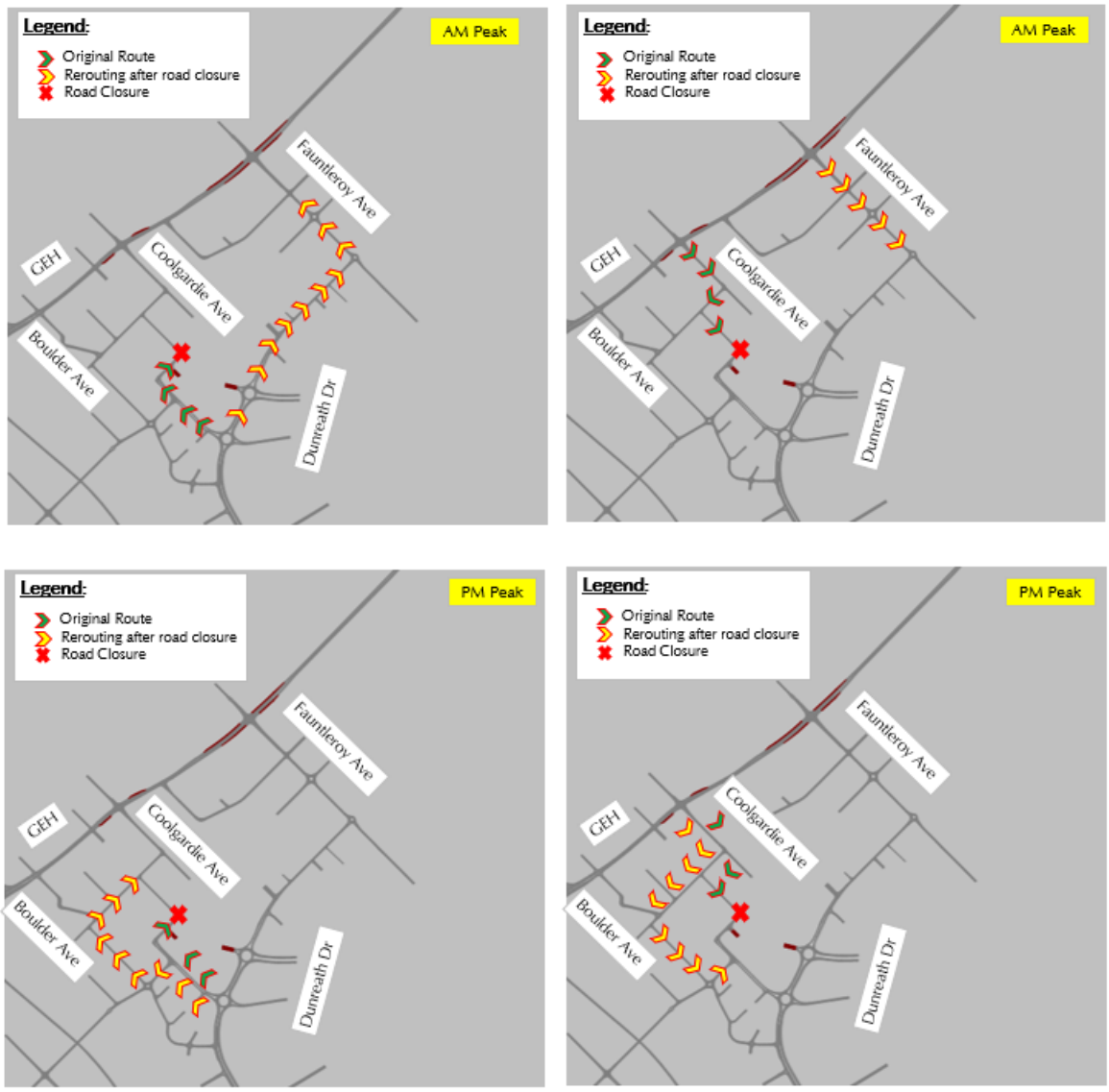


Figure 6: Implementing a cul-de-sac closure at Bulong Avenue/Boorn Street and rerouting traffic during AM and PM peak hours

5.1.3 Closure of Central Avenue

One potential solution suggested in the community engagement feedback for managing Perth Airport traffic through local roads was the closure of Central Avenue south of Second Street. The transport modelling and analysis conducted for this proposal indicate that closing Central Avenue could result in reduction in traffic on Second Street and Stanton Road during the AM and PM peak hours, respectively. However, this modification would redistribute traffic to High Street, Dunreath Drive and the car park driveway to the east of High Street as shown in Figure 7 and explained below and in Table 3.

Table 3: VISSIM outputs for closure of Central Avenue

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Stanton Rd (West of Kanowna Ave)	720	610	-110	-15%
	High St	60	600	540	900%
	Dunreath Dr (West of High St)	1251	1277	26	2%
	Boulder Ave	66	51	-15	-23%
PM	Stanton Rd (West of Kanowna Ave)	1000	850	-150	-15%
	High St	200	980	780	390%
	Dunreath Dr (West of High St)	1823	1819	-4	0%
	Boulder Ave	58	76	18	31%

Second Street and Stanton Road:
AM and PM: The closure is projected to reduce traffic by 15% on these roads during peak times. This reduction could be beneficial in alleviating traffic congestion on these roads.

High Street:
High Street would have a 900% increase in AM traffic and a 390% increase in PM traffic after closure of Central Avenue. High Street is designed as a low-speed access street with a pedestrian-friendly environment, featuring a mini roundabout, raised plateau, and an advisory speed limit of 20 km/h in eastern section. The projected increase in traffic volume on this road would likely result in congestion and safety issues for all road users along this road. Additionally, there is a risk that drivers may use the car park driveway as a shortcut, or "rat run," to avoid congestion. This behaviour is not desirable, as it could further compromise safety and disrupt the car park traffic flow.

Car Park Driveway:
The risk of drivers using the car park driveway as a "rat run" to avoid congestion on High Street is significant. This behaviour could lead to unpredictable traffic flow within the car park, increasing the likelihood of accidents and disrupting the intended use of the car park facilities.

Overall Findings:
Therefore, the proposed closure of Central Avenue would extremely redistribute Perth Airport traffic onto other local roads particularly High Street, and is not justified appropriate in the current situation.

Figure 7: VISSIM modelling output for closure of Central Avenue

5.1.4 Closure of Stanton bridge

Another potential solution suggested in the community engagement feedback for managing Perth Airport traffic through local roads was the closure of the Stanton bridge to vehicular traffic. Currently, the bridge accommodates around 14,000 vpd, and its closure would significantly redistribute this traffic onto local roads, potentially causing congestion in various areas of the traffic modelling area. To evaluate the impact of this closure more thoroughly, the bridge was removed from the base case calibrated model for analysis.

The VISSIM modelling outputs, illustrated in Figure 8, reveal concerning outcomes during both AM and PM peak hours. In the AM peak, the westbound traffic that typically uses Stanton Road is projected to divert mainly to Epsom Avenue, leading to operational challenges, including long queues and increased delays. Additionally, the right-turn movements from GEH onto Epsom Avenue will be redirected to Coolgardie Avenue and Fauntleroy Avenue, likely resulting in extended queues and excessive delays along GEH itself.

During the PM peak hour (4:00-5:00), the scenario worsens as eastbound traffic on Stanton Road is expected to divert to Boulder Avenue, Coolgardie Avenue, and Fauntleroy Avenue. This diversion will likely cause queues on Fauntleroy Avenue to extend back to Central Avenue. Furthermore, Epsom Avenue is anticipated to experience significant congestion, with queues stretching back to Durban Street.

Overall Findings:
Overall, the closure of the Stanton bridge would lead to increased traffic congestion at key access points along Tonkin Highway, Durban Street, and Boulder Avenue, resulting in longer queues and delays at several intersections and potentially leading to gridlock in the area and therefore it is not favoured.

Figure 8: VISSIM modelling output for closure of Stanton bridge

5.1.5 Closure of Moreing Street, Lyall Street and Boulder Avenue at GEH

Another possible solution to control the level of through traffic on local roads, particularly at the intersections of Moreing Street, Lyall Street, and Boulder Avenue, is to terminate these intersections at the GEH end.

The VISSIM model results, shown in Figure 9, indicate that during the AM peak, the majority of the traffic from Moreing Street and Lyall Street will be redirected to Epsom Avenue to access GEH. This change is likely to create queues and congestion on Epsom Avenue. Additionally, the model suggests increased traffic on Fauntleroy Avenue due to the closure of Boulder Avenue at GEH, leading to queues and congestion on Fauntleroy Avenue.

During the PM peak hour (4:00-5:00), the model indicates that part of the Perth Airport traffic currently using Stanton Road and Boulder Avenue to join GEH will shift to Coolgardie Avenue and Fauntleroy Avenue, further contributing to existing queues on these roads during the PM peak hour (refer Figure 9).

Moreover, the current left-turn traffic from GEH to Boulder Avenue, Moreing Street, and Lyall Street will be mainly redirected to Coolgardie Avenue and Epsom Avenue. These traffic shifts are expected to create queues on Fauntleroy Avenue, Coolgardie Avenue, and Epsom Avenue.

Overall Findings:
This scenario would lead to increased traffic congestion at key access points along Epsom Avenue, Coolgardie Avenue, and Fauntleroy Avenue, resulting in longer queues and delays in the area. Therefore, this option is not favoured.

Figure 9: VISSIM modelling output for closure Moreing Street, Lyall Street and Boulder Avenue at GEH

5.2 Traffic calming measures options

5.2.1 LCURS Program, Stanton Road and Second Street

The City has previously explored traffic calming measures along Stanton Road and Second Street as part of the LCURS Program. This initiative aims to reduce the likelihood of traffic incidents on local roads throughout the metropolitan area in response to safety concerns and community feedback. Proposed treatments along Stanton Road and Second Street are shown in Figure 10 and can be found in below link: https://connect.belmont.wa.gov.au/low-cost-urban-road-safety-program.

The program involves installing low-cost road treatments such as the installation of speed cushions and raised safety platforms. Features include red asphalt with shark teeth markings to improve driver awareness of the road profile change. Further, it is suggested that the section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) will be signposted at 40 km/h, following consideration of approval by Main Roads WA. Reduced speeds will lead to an improvement in safety at conflict areas such as intersections and improve movement conditions for pedestrians and cyclists.

Transcore coded the original traffic calming measures in the existing calibrated base case model and the impact of the treatments on the existing road network are summarised in Table 4.

As evident, the proposed traffic calming measures under the LCURS, do not significantly change the traffic volumes on the modelling study area road network. The data shows minor fluctuations, with some roads experiencing slight decreases (e.g., Stanton Road with a 1-2% decrease) and others minor increases (e.g., Morrison Street with a about 10% increase). These changes are not substantial enough to suggest a significant impact on traffic flow. Given that the current treatments are not significantly altering traffic volumes, it suggests that different types of treatments or a combination of various traffic calming measures along with potential changes to the road network might be necessary. This could involve more aggressive speed reduction techniques, physical barriers to prevent certain traffic movements, or reconfiguration of road layouts to better manage traffic distribution.

Table 4: VISSIM output for LCURS Scenario

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Stanton Rd (West of Kanowna Ave)	720	711	-9	-1%
	Boulder Ave	66	67	1	2%
	Lyall St	156	162	6	4%
	Morrison St	40	44	4	10%
	Moreing St	106	104	-2	-2%
	Epsom Ave (South of GEH)	744	729	-15	-2%
PM	Stanton Rd (West of Kanowna Ave)	1000	982	-18	-2%
	Boulder Ave	80	81	1	1%
	Lyall St	241	237	-4	-2%
	Morrison St	46	51	5	11%
	Moreing St	96	94	-2	-2%
	Epsom Ave (South of GEH)	815	816	1	0%

Figure 10:Proposed original traffic calming measures as part of the LCURS program

5.2.2 *Implementing Revised LCURS treatments, Stanton Road and Second Street*

Revised LCURS proposal was considered involving removal of speed cushions, mid-block plateaus and introduction of raised plateau at Morrison Street with roundabout and the following traffic calming items (as shown in Figure 11).

- Pedestrian crossing west of Lyall Street.
- Children crossing west of Morrison Street.
- Children crossing east of Kanowna Avenue.

Further, the section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) will be signposted at 40 km/h, following consideration of approval by Main Roads WA. Reduced speeds will lead to an improvement in safety at conflict areas such as intersections and improve movement conditions for pedestrians and cyclists.

In selecting the treatments and their locations, careful consideration was given to community feedback and discussions with The City and Main Roads WA. The proposed children's crossings aim to enhance safety and amenity for children, addressing community requests. Additionally, the pedestrian crossing west of Lyall Street is intended to improve safety for residents of the nearby aged care facilities. The proposed roundabout at Morrison Street and Stanton Road is designed to enhance traffic circulation for school traffic and regulate speed on Stanton Road. The raised platform at the roundabout will emphasise the low-speed environment near the school, encouraging drivers to navigate the roundabout with caution and improved opportunity for traffic movements crossing Stanton Road from Morrison Street.

The combination of these treatments is expected to effectively regulate speed limits on Stanton Road and improve safety and amenity for residents, which was raised as a key concern of the community.

The proposed traffic calming measures were coded into the existing (2024) VISSIM model. A dummy signal was added at the proposed children's crossing points west of Morrison Street and east of Kanowna Avenue, simulating traffic stops for about 15 seconds every five minutes during the AM peak hours (8:00 to 9:00). This signal would not be active during the PM peak hour (4:00-5:00) as the school is closed at this time.

Similarly, the proposed signalised pedestrian crossing west of Lyall Street is assumed to activate every 5 minutes for 15 seconds during both AM and PM modelled peak hours to allow safe pedestrian crossing.

The review of the microsimulation models during the AM and PM peak hours indicated that the proposed traffic calming measures, including a reduction of the posted speed limit on Stanton Road and Second Street to 40 km/h, would decrease traffic volumes on Stanton Road and Second Street by approximately 13% during the AM and PM peak hours (see Table 5).

Figure 11: Existing and proposed traffic calming measure along Stanton Road and Second Street

Table 5: VISSIM output for Revised LCURS scenario

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Stanton Rd (West of Kanowna Ave)	720	626	-94	-13%
	Boulder Ave	66	74	8	12%
	Lyall St	156	154	-2	-1%
	Morrison St	40	46	6	15%
	Moreing St	106	100	-6	-6%
	Epsom Ave (South of GEH)	744	707	-37	-5%
PM	Stanton Rd (West of Kanowna Ave)	1000	870	-130	-13%
	Boulder Ave	80	160	80	100%
	Lyall St	241	217	-24	-10%
	Morrison St	46	52	6	13%
	Moreing St	96	84	-12	-13%
	Epsom Ave (South of GEH)	815	774	-41	-5%

As a result of these initiatives and the redistribution of traffic, below changes in traffic volumes along the following key roads are anticipated:

- Boulder Avenue: +12% increase in the AM and 100% increase in the PM.
- Lyall Street: -1% decrease in the AM and -10% decrease in the PM.
- Moreing Street: -6% decrease in the AM and -13% decrease in the PM.
- Epsom Avenue: -5% decrease in the AM and PM.
- Morrison Street: 15% and 13% increase in the AM and PM.

The average of five model runs for the AM and PM peak hours indicates that the proposed treatments would redirect traffic away from Stanton Road and Second Street, as well as existing local roads to the west of the Tonkin Highway, particularly Lyall Street and Moreing Street. However, this will result in increased traffic on Boulder Avenue, especially during the PM peak hour. Consequently, some vehicles, including airport traffic, are likely to use Boulder Avenue and turn left onto GEH instead of using Stanton Road, particularly during the PM peak.

It is important to note that main distributor roads, such as GEH and Dunreath Drive, are operating at capacity during the peak hours, which impacts the effectiveness of both existing and proposed traffic calming measures on Stanton Road and surrounding local roads.

However, with the recent relocation of Jetstar flights from Perth Airport Terminal 3 to Terminal 2, and the upcoming move of Qantas flights to Terminals 1 and 2, traffic volumes on Redcliffe area would decrease. This shift is expected to encourage long-distance trips and through traffic in the Redcliffe area to use Dunreath Drive, Tonkin Highway, and GEH instead of Stanton Road and Second Street.

The proposed relocation of Terminal 3 and 4 would allow for more redistribution of traffic to Dunreath Drive/ Tonkin Highway and would reduce the impact on Boulder Avenue.

In order to compare the effectiveness of the proposed treatments under the revised LCURS scenario, the impact of both scenarios on the road network were compared and summarised in Table 6.

The comparison between the two scenarios indicates that the revised treatments under the LCURS program are more effective at reducing traffic volumes, which could lead to improved safety and traffic flow on the local road network. For instance, Stanton Road saw a 13% decrease in AM and a 13% decrease in PM traffic, which is a more substantial change compared to the original scenario. Similarly, Lyall Street, Moreing Street, and Epsom Avenue all experienced greater reductions in traffic with the revised treatments, indicating an improvement in traffic management and potentially road safety.

5.2.3 Reducing speed limits on all local roads to 40 km/h

Considering the satisfactory outcome of the traffic calming measures on Stanton Road and Second Street combined with the reduced speed limit along these two roads, Transcore undertook another modelling scenario to test reduction of the existing speed limits on all local roads from 50 km/h to 40 km/h.

Implementing a 40km/h speed limit throughout the local roads in the Redcliffe area necessitates approval from Main Roads WA. Specifically, this change would require the addition of further traffic calming measures in line with the LCURS guidelines. The implementation of this 40 km/h limit is expected to occur in stages over several years.

The traffic modelling and analysis for this scenario resulted in slight traffic reduction on Stanton Road and Coolgardie Avenue with slight traffic increase on Fauntleroy Avenue and Dunreath Drive. As explained before the main distributor roads, such as GEH and Dunreath Drive, are operating at capacity during the peak hours, which impacts the effectiveness of the speed reduction in the current situation. Therefore, while the proposed reduction of speed limit would improve safety of all road users on local roads, it would not significantly change the exiting traffic volumes on the local roads.

Table 6: VISSIM output comparison for two scenarios – LCURS and Revised LCURS

	Roads With Significant Changes	Without Treatment	Original LCURS			Revised LCURS		
			With Treatment	Difference		With Treatment	Difference	
				Value +/-	% +/-		Value +/-	% +/-
AM	Stanton Rd (West of Kanowna Ave)	720	711	-9	-1%	626	-94	-13%
	Boulder Ave	66	67	1	2%	74	8	12%
	Lyall St	156	162	6	4%	154	-2	-1%
	Morrison St	40	44	4	10%	46	6	15%
	Moreing St	106	104	-2	-2%	100	-6	-6%
	Epsom Ave (South of GEH)	744	729	-15	-2%	707	-37	-5%
PM	Stanton Rd (West of Kanowna Ave)	1000	982	-18	-2%	870	-130	-13%
	Boulder Ave	80	81	1	1%	160	80	100%
	Lyall St	241	237	-4	-2%	217	-24	-10%
	Morrison St	46	51	5	11%	52	6	13%
	Moreing St	96	94	-2	-2%	84	-12	-13%
	Epsom Ave (South of GEH)	815	816	1	0%	774	-41	-5%

5.3 Combination of the selected modelling scenarios

The traffic modelling scenarios, which resulted in traffic reduction on local roads and in particular Stanton Road and Second Street and demonstrated their effectiveness in reducing traffic volumes on local roads and enhancing safety and amenity for residents are listed below:

- LILO treatment at Lyall Street/ Stanton Road; and,
- Implementing traffic calming measures on Stanton Road and Second Street (Revised LCURS).

However, these modelling scenarios were modelled individually, it is essential to model the combination of these preferred scenarios to ensure that one scenario does not negatively impact the traffic outcomes of another.

The result of the traffic modelling and analysis undertaken for the combination of preferred modelling scenarios are summarised in Table 7.

Table 7: VISSIM output for combination of the preferred modelling scenarios

	Roads With Significant Changes	Without Treatment	With Treatment	Difference	
				Value +/-	% +/-
AM	Coolgardie Ave	202	203	1	0%
	Boulder Ave	66	70	4	6%
	Central Ave	745	749	4	1%
	Second St	685	690	5	1%
	High St	64	66	2	3%
	Stanton Rd (East of Kanowna Ave)	737	730	-7	-1%
	Lyall St	156	52	-104	-67%
	Moreing St	106	134	28	26%
	Morrison St	40	46	6	15%
	Epsom Ave (South of GEH)	744	751	7	1%
PM	Coolgardie Ave	203	240	37	18%
	Boulder Ave	80	172	92	115%
	Central Ave	997	999	2	0%
	Second St	901	860	-41	-5%
	High St	207	210	3	1%
	Stanton Rd (East of Kanowna Ave)	1056	953	-103	-10%
	Lyall St	241	30	-211	-88%
	Moreing St	96	132	36	38%
	Morrison St	46	51	5	11%
	Epsom Ave (South of GEH)	815	944	129	16%

The significant changes in traffic volumes particularly during the PM peak highlight the effectiveness of the proposed combined treatments in reducing congestion on Stanton Road and Lyall Streets while rerouting some traffic to Boulder Avenue, Moreing Street, and Epsom Avenue.

To compare the effectiveness of the below scenarios for reducing traffic volumes on Stanton Road and other local roads, a comparison table (refer to Table 8) has been prepared. The scenarios evaluated are:

- LILO at the intersection of Lyall Street/Stanton Road
- Revised LCURS
- Combination of Preferred Scenarios

Each scenario has been reviewed and ranked based on its effectiveness in reducing traffic volumes on Stanton Road first, followed by the impact on other local roads.

1. Revised LCURS

Highest traffic reduction on Stanton Road for both peak periods: -94 vph (8:00-9:00 am), -130 vph (4:00-5:00 pm)

Advantages:

- Highest reduction in traffic volumes on Stanton Road.
- Improved traffic flow and reduced congestion.

Disadvantages:

- Potentially redistribute traffic on alternative routes.

2. Combination of the Preferred Scenarios

Traffic reduction on Stanton Road during the PM peak hour only: -9 vph (8:00-9:00 am), -105 vph (4:00-5:00 pm)

Advantages:

- Effective in reducing traffic on Stanton Road during the PM peak hour.

Disadvantages:

- Minimal reduction compared to other scenarios during the AM peak.

3. LILO at Lyall Street/Stanton

Moderate reduction on Stanton Road: -47 vph (8:00-9:00 am), -77 vph (4:00-5:00 pm)

Advantages:

- Relatively effective reduction in traffic during peak hours.
- Helps redirect Perth Airport traffic away from residential areas along Lyall Street.
- Improved traffic safety at the intersection with removal of the right turn and through movement conflicts.

Disadvantages:

- May cause increased traffic on adjacent streets.

Conclusion

The Revised LCURS scenario demonstrates the highest effectiveness in reducing traffic on Stanton Road, achieving a better decrease in vehicle counts during both AM and PM peak hours. This scenario would address congestion concerns more effectively, making it the most favourable option for improving traffic flow in the area.

The Combination of the Preferred Scenarios offers reduction in traffic volumes on Stanton Road, during the PM peak hour. However, not very effective during the AM peak hour.

The LILO at Lyall Street scenario, while effective in significantly reducing traffic on Lyall Street, results in only a moderate decrease in traffic on Stanton Road. The changes it introduces could redirect traffic onto adjacent streets, however would not undermine traffic operation or safety. There are also safety improvements at this intersection with the removal of the right turn and through movement conflicts.

Given these findings, it is recommended that the Revised LCURS treatments be implemented as the primary solution for traffic management on Stanton Road.

Additionally, the proposed LILO on Lyall Street could be considered as a trial and temporary measure. It is essential to monitor traffic movement following the conversion of Lyall Street to LILO. If this approach proves effective in managing traffic flow and reducing congestion, it could then be considered for permanent implementation. This phased approach allows for adjustments based on real-world outcomes, ensuring that the traffic management strategies adopted are both effective and sustainable.

Table 8: Comparison of Scenarios

		Roads With Significant Changes	Without Treatment	With Treatment	Difference	
					Value +/-	% +/-
AM	LILO at Lyall St/Stanton Rd	Boulder Ave	66	69	3	5%
		Stanton Rd (West of Kanowna Ave)	720	767	47	7%
		Lyall St	156	50	-106	-68%
		Moreing St	106	137	31	29%
		Epsom Ave (South of GEH)	744	756	12	2%
	Revised LCURS	Boulder Ave	66	74	8	12%
		Stanton Rd (West of Kanowna Ave)	720	626	-94	-13%
		Lyall St	156	154	-2	-1%
		Moreing St	106	100	-6	-6%
		Epsom Ave (South of GEH)	744	707	-37	-5%
	Combination of the Preferred Scenarios	Boulder Ave	66	70	4	6%
		Stanton Rd (West of Kanowna Ave)	720	711	-9	-1%
		Lyall St	156	52	-104	-67%
		Moreing St	106	134	28	26%
		Epsom Ave (South of GEH)	744	751	7	1%
PM	LILO at Lyall St/Stanton Rd	Boulder Ave	80	140	60	75%
		Stanton Rd (West of Kanowna Ave)	1000	923	-77	-8%
		Lyall St	241	45	-196	-81%
		Moreing St	96	181	85	89%
		Epsom Ave (South of GEH)	815	840	25	3%
	Revised LCURS	Boulder Ave	80	160	80	100%
		Stanton Rd (West of Kanowna Ave)	1000	870	-130	-13%
		Lyall St	241	217	-24	-10%
		Moreing St	96	84	-12	-13%
		Epsom Ave (South of GEH)	815	774	-41	-5%
	Combination of the Preferred Scenarios	Boulder Ave	80	172	92	115%
		Stanton Rd (West of Kanowna Ave)	1000	895	-105	-11%
		Lyall St	241	30	-211	-88%
		Moreing St	96	132	36	38%
		Epsom Ave (South of GEH)	815	944	129	16%

5.4 Summary and Conclusions

Transcore utilised the existing calibrated base case model to explore various scenarios and options aimed at redistributing traffic on local roads, ultimately enhancing safety and amenity for residents. The options tested were categorised into two main types: Network Change Options and Traffic Calming Measures. These categories were identified from analysis that included crash data, site observations, and community feedback, ensuring that the scenarios responded to specific needs and concerns of the local community.

Each modelling scenario was evaluated individually to assess its impact, and the preferred scenarios were subsequently tested in combination. This approach was crucial to ensure that the effects of one scenario did not negate the benefits of another. The traffic modelling and analysis indicated that the Revised LCURS treatments should be implemented as the main traffic management solution for Stanton Road. Furthermore, the proposed LILO on Lyall Street could be considered as a trial measure with monitoring over time.

5.5 Short term recommendations

Traffic modelling and analysis undertaken indicated that implementing the following modifications will provide satisfactory results in reducing traffic volumes on local roads and improving the safety and amenity for residents. Therefore, the following modifications are recommended in the short term:

- Stanton Road and Second Street
- Raised platforms at Moreing Street and Lyall Street.
- Raised platform at Morrison Street with roundabout.
- Pedestrian crossing west of Lyall Street.
- Children crossing west of Morrison Street.
- Children crossing east of Kanowna Avenue.
- Reducing the speed limit for the section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) to 40 km/h.
- LILO treatment at Lyall Street/ Stanton Road – as a trial.

- Investigate proposal of applying 40 km/h speed limit on all Redcliffe area road network.

Further, detailed investigations are required to address safety issue and confirm the appropriate treatments for the following intersections:

- First Street/ Bulong Avenue;
- Victoria Street/ Moreing Street;
- Epsom Avenue/ Durban Street/ Stanton Road;
- Redcliffe Road/ Fauntleroy Avenue;
- Epsom Avenue/ Victoria Avenue;
- Second Street/ Kanowna Avenue; and,

- Morrison Street/Treffone Street/Ryans Court.

In addition to the above modifications, Transcore suggests the following measures to be monitored and controlled to ensure the effectiveness of the proposed changes:

Speed compliance patrols: it is suggested that the section between Epsom Avenue and Central Avenue (Stanton Road and Second Street) should be signposted at 40 km/h. The City is encouraged to request the WA Police to have an active speed campaign along Stanton Road and Second Street.

Truck movement restrictions: All of the roads within the modelling study area (except western section of Dunreath Drive, Ben Street and Redcliffe Road which are RAV Tandem Drive 4) are classified as RAV Tandem Drive 1 which means that only "as of right" vehicles would be able to travel on these roads. Therefore, heavy vehicles longer than 19m should be restricted on all the other local roads. The City needs to monitor and raise any non-compliant movements with Main Roads WA for their action.

Bus movement from depot to Redcliffe station: Advocacy to PTA for not using route via Ben Street, GEH, Coolgardie Avenue, First Street and Bulong Avenue.

6 Medium Term (2032+)

The medium term scenario reflects the relocation of the Jetstar and Qantas terminals to Terminal 2. According to the Perth Airport Master Plan 2020 "*as all regular passenger transport services will be consolidated within the Airport Central Precinct by the end of 2025* (likely 2032), *no additional land is likely to be required for regular aviation purposes in the Airport West Precinct. Terminal 3 and Terminal 4 will remain as passenger terminals until 2025, after which the redundant terminal buildings will be demolished, as they have reached the end of their useful life*".

After 2025 (likely 2032), *land within the Airport West Precinct will progressively become available for complementary, non-aviation land uses including offices, retail and commercial. The existing services and established road network with abundant car parking is available for use (and re-use) by complementary land uses*.

As a result, trips generated from Perth Airport zones within the modelling study area were removed from the demand matrices, and the 2032 matrices were prepared and loaded into the 2032 road network. The 2032 road network is assumed to be similar to the existing 2024 road network, as minimal upgrades are anticipated until the full relocation of the Jetstar and Qantas terminals is completed.

Additionally, it is assumed that trip generation from all internal residential zones located east of the Tonkin Highway within the modelling study area are increased by around 2% per annum to account for potential subdivisions or minor developments by 2032. Traffic projections on GEH are also expected to rise by around 2% per annum from 2024 to 2032.

Review of the 2032 Transport model indicates that relocation of the Jetstar and Qantas terminals would reduce the traffic volumes on most of the roads within the modelling study area and in particular on Stanton Road and Second Street by around 50%.

In the medium term no major congestion is expected on local roads within the modelling study area including Second Street, Stanton Road, Lyall Street and Moreing Street. Due to the general traffic growth on GEH, some congestion similar to the existing situation at the signalised intersections along this road within the modelling study area is expected.

The relocation of the Jetstar and Qantas terminals is projected to significantly alter traffic volumes on several key roads in the area (refer Table 9). This change is primarily driven by the anticipated reduction in congestion associated with airport-related traffic.

For example, when averaging the morning and afternoon peak periods, Second Street will see a dramatic decrease in traffic, with volumes dropping from approximately 685 vph in the morning and 901 vph in the afternoon to about 196 vph in the morning and 409 vph in the afternoon. This results in an average reduction from 793 vph to 303 vph, reflecting a substantial decrease of around 62%.

Fauntleroy Avenue is projected to experience a significant reduction as well. The average traffic volume will decrease from 571 vph in the morning and 715 vph in the afternoon to 210 vph in the morning and 360 vph in the afternoon. This indicates an average reduction from 643 vph to 285 vph, leading to a 56% decrease.

Dunreath Drive will benefit similarly, with traffic volumes expected to drop from 1,293 vph in the morning and 1,876 vph in the afternoon to 515 vph in the morning and 873 vph in the afternoon. The average volume will reduce from 1,335 vph to 694 vph, resulting in a decrease of approximately 48%.

Stanton Road will also see a notable reduction, with average traffic volumes decreasing from 737 vph in the morning and 1,038 vph in the afternoon to 358 vph in the morning and 552 vph in the afternoon. This leads to an average reduction from 887 vph to 455 vph, representing a decrease of around 49%.

Boulder Avenue and Epsom Avenue will experience smaller reductions. Boulder Avenue's average traffic volume is expected to drop from 66 vph in the morning and 80 vph in the afternoon to an average of 43 vph in the morning and 42 vph in the afternoon, resulting in a decrease from 73 vph to 43 vph, which is about a 41% reduction. Epsom Avenue will see a decrease from an average of 932 vph in the morning and 1,012 vph in the afternoon to 783 vph in the morning and 813 vph in the afternoon, leading to an average reduction from 972 vph to 798 vph, representing a decrease of about 18%.

Overall, the analysis indicates that the relocation of the terminals will lead to significant reductions in traffic volumes across these key roads, with no roads expected to experience increases in traffic.

Table 9: Model outputs for medium term 2032+

	Roads With Significant Changes	Existing	2032+	Difference	
				Value +/-	% +/-
AM	Dunreath Dr	1293	515	-778	-60%
	Boulder Ave	66	43	-23	-35%
	Fauntleroy Ave	571	210	-361	-63%
	Second St	685	196	-489	-71%
	Stanton Rd (East of Kanowna Ave)	737	358	-379	-51%
	Lyall St	156	134	-22	-14%
	Moreing St	106	76	-30	-28%
	Epsom Ave (South of Durban St)	932	783	-149	-16%
PM	Dunreath Dr	1876	873	-1003	-53%
	Boulder Ave	80	42	-38	-48%
	Fauntleroy Ave	715	360	-355	-50%
	Second St	901	409	-492	-55%
	Stanton Rd (East of Kanowna Ave)	1038	552	-486	-47%
	Lyall St	241	189	-52	-22%
	Moreing St	96	74	-22	-23%
	Epsom Ave (South of Durban St)	1012	813	-199	-20%

6.1 Medium term recommendations

The following recommendations are proposed for the 2032 (post Qantas terminal relocation) scenario:

- Traffic Monitoring: The City continue to monitor traffic volumes and crash records on local roads towards confirming future improvements.
- Investigate additional traffic calming measures: The City to ensure that the proposed traffic calming treatments (outlined for short term) implemented along Stanton Road and Second Street perform effectively. Additional traffic calming measures may be introduced on other local roads following the active traffic monitoring post Qantas terminal relocation.
- Active Transport Improvements: The following Active Transport proposals suggested by Perth Airport to be investigated and considered as part of the Sustainable Transport Plan for The City:
    - Cycleway parallel with Tonkin Highway linking The Court/ Victoria Street North with Stanton Road.
    - Recreational Shared Path (RSP), Coolgardie Avenue, First Avenue and Victoria Street north.
    - RSP along old Brearley Avenue.
    - RSP along Stanton Road/ Second Street between Central Avenue and bridge over Tonkin Highway.
    - RSP along Dunreath Drive.
    - RSP along Fauntleroy Avenue.

- Optimisation of the GEH signalised intersections: In collaboration with Main Roads WA, The City advocate to improve traffic operations along GEH. This includes optimizing traffic signals, enhancing pedestrian crossings, and upgrading turning movements at signalised intersections in line with Main Roads WA's ultimate upgrade plans for the GEH.
- Public Transport Coordination: The City advocate to the PTA to synchronise bus and train timetables and schedules, and adjust bus frequency as necessary.
- Perth Airport West Precinct development: The City review developments in the Perth Airport West Precinct, ensuring that developments and relevant road network upgrades occur simultaneously to prevent congestion in the Redcliffe area.

7 Long Term (2041+)

7.1 Redcliffe Station Precinct Improvement Scheme

Transcore and The City have met with DPLH regarding the Redcliffe Station Precinct Improvement Scheme and discussed the land use and timing for the implementation of the improvement scheme. Accordingly, DPLH provided the Redcliffe Station Precinct Improvement Scheme document prepared by Taylor Burrell Barnett in July 2024 to outline and provide explanatory information regarding the feasibility of increased development intensity across the Redcliffe Station Precinct. The following sections outline the available information regarding the land use and vehicle access for the Precinct.

7.1.1 Land use and trip generation

According to the Redcliffe Station Precinct Improvement Scheme, the land use across the Precinct will predominately be residential, with mixed use opportunities focussed around Redcliffe Train Station and along GEH. The Improvement Scheme investigated low, moderate and high growth scenarios for the Redcliffe Station Precinct and suggested that the Moderate Growth Scenario should form the basis of refined primary controls for the Precinct. The moderate Growth Scenario has the potential to achieve 2,598 dwellings and represents the most probable development outcome for the Precinct.

Along the GEH, the type of commercial uses that may develop will be dependent on the long-term intersection treatment between Tonkin Highway and GEH. Should GEH be widened with reduced access to side streets and businesses, commercial uses will likely be less viable and vacant floorspace may result. Should access to passing traffic be maintained, it is likely that highway commercial and potentially short-stay accommodation and supporting uses including food and beverage, can continue to develop along this section of the Highway.

Flyt consultant prepared a Traffic Impact Assessment (TIA) in 2019 for DPLH for the proposed Redcliffe Station Precinct Activity Centre Plan (ACP). The following land uses were assumed in Flyt report for the assessment which is in line with the objectives of the Redcliffe Station Precinct Improvement Scheme:

- Commercial – 28,470m²
- Residential – 2,070 apartments and 853 single / grouped dwellings.
- Train Station with Park and Ride and Kiss and Ride.

The estimated trip generation of the above land uses are summarised in Table 10. In line with the assumptions assumed in Flyt 2019 TIA for DPLH. The trip generation for the existing Costco and DFO is assumed to remain consistent with the traffic surveys conducted in 2024.

Table 10: Trip Generation Summary

Land Use	AM Peak Hour		PM Peak Hour	
	Arrival	Departure	Arrival	Departure
Commercial	174	31	41	164
Residential	260	779	870	429
Park and Ride and Kiss and Ride	500	200	200	500
Total	**934**	**1,010**	**1,111**	**1,093**

7.1.2 Vehicle access

According to the Redcliffe Station Precinct Improvement Scheme direct access to GEH from Bulong and Central Avenue is currently restricted by cul-de-sacs. The draft ACP proposes to retain this restriction until such time as:

- *The domestic operations of Qantas relocate from Airport West to Airport Central;*
- *The upgrades to GEH are complete; and*
- *A traffic impact assessment is undertaken to demonstrate that direct connection of these roads will not have undue impact on the safety and efficiency of the local road network.*

7.2 Perth Airport

According to the information provided by Perth Airport, the Perth Airport Masterplan (2020) is currently under review. The Airport West Precinct area will have the most significant impacts on traffic movements in the adjacent Redcliffe area.

The Airport West Precinct, spans an area of 341 hectares and will continue to serve a variety of aviation support facilities and associated ground transport infrastructure until the end of 2032. This timeline coincides with Qantas's planned relocation from Terminal 3 and 4 (T3/T4) to a new terminal within the Airport Central Precinct. With the consolidation of all regular passenger transport services within the Airport Central Precinct anticipated to be completed by the end of 2032, it is expected that no additional land will be required for regular aviation purposes within the Airport West Precinct.

Currently, Airport West has a total of 10,210 parking bays. Following the consolidation of all commercial air services to Airport Central, these existing car parking areas will present significant redevelopment opportunities.

7.2.1 Airport West Precinct Non-Aviation Development Plan

Currently, there has been notable progress in non-aviation development over the past years including DFO and Costco. After 2032, land within the Airport West Precinct will progressively become available for complementary, non-aviation land uses including:

- High-amenity office park,
- Destination themed retail park, and
- Establishment of land uses, such as entertainment and leisure, which may not be permitted in other localities closer to noise sensitive land uses.

At the time of preparing this report, Perth Airport has not finalised the long-term plan detailing specific land uses and the staged development of potential projects. Therefore, Transcore has made the following assumptions to estimate realistic traffic generation from the Perth Airport West Precinct by 2041.

The total undeveloped area of the Perth Airport West Precinct is approximately 200 hectares. It is assumed that about 50% of this land will be developed by the year 2041, with a build-up area comprising roughly 50% of the developable land. Accordingly, the estimated trip generation from the Perth Airport West Precinct is summarised in Table 11.

At this stage and in the absence of any updated information from Perth Airport, it is assumed that the developable land would be equally allocated to Entertainment / Leisure, Office/ Business, Retail, Bulky goods and Showroom.

According to Table 11, the trip generation of the Perth Airport West Precinct is estimated to be approximately 103,000vpd and about 5,332vph and 10,663vph during the AM and PM peak hours respectively.

Table 11: Trip generation of the proposed land uses

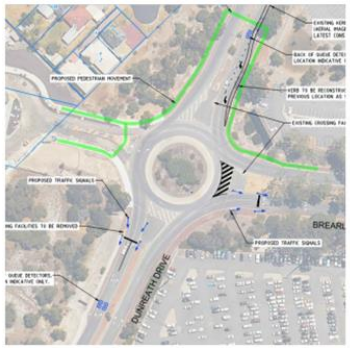
Land use	Quantity	Daily Rates	AM peak Rates	PM peak Rates	Cross Trade	Daily Trips	AM peak Trips	PM peak Trips	AM		PM	
									IN	OUT	IN	OUT
Entertainment / leisure	100,000	0.31	0.02	0.03	0.25	23495	1557	2038	779	778	1019	1019
Office/ business	100,000	0.110	0.016	0.012	0.25	8250	1200	900	960	240	180	720
Retail	100,000	0.78	0.019	0.076	0.25	58500	1900	5700	950	950	2850	2850
Bulky goods	100,000	0.17	0.00675	0.027	0.25	12750	675	2025	338	337	1013	1012
Showroom	100,000	0.33	0.0105	0.042	0.25	24750	1050	3150	525	525	1575	1575
TOTAL TRAFFIC						102,995	5,332	10,663	3,027	2,305	5,062	5,601

7.2.2 Perth Airport Major Upgrade Proposals

According to the information provided by Perth Airport, a number of upgrades are suggested by Perth Airport which would be constructed by 2041 to support the progressive development of the West Precinct and has been considered in 2041 traffic modelling and analysis. The major upgrades to the road network are shown in Figure 12.

Current observations reveal occasional traffic congestion at the signalised intersection of Dunreath Drive and the Tonkin Highway off-ramp, leading to queue backups that sometimes extend onto the Tonkin Highway.

Traffic modelling and analysis indicate that, in the medium term, following the relocation of the Jetstar and Qantas terminals, the level of queuing and congestion at this intersection is expected to decrease significantly. However, with future developments planned for the Perth Airport West Precinct, traffic volumes at this signalised intersection are projected to increase significantly. Even with the proposed upgrades shown in Figure 12, the queue on the Tonkin Highway off-ramp at this intersection is likely to extend back onto the Tonkin Highway.



Upgrades to Dunreath/ Brearley

- Traffic signals and queue detectors instated at the intersection.
- Widening of the northern approach to accommodate a left turn pocket
- Realignment of the pedestrian crossing to the north

Upgrades to Tonkin/ Dunreath

- Widening of the Tonkin northbound off-ramp.
- Widening of Dunreath Drive bridge to accommodate a third lane (additional lane eastbound)
- Southbound off-ramp to become give-way controlled.

Upgrades to Dunreath/ Old Dunreath

- Reconfiguring Costco egress to have two right turn lanes towards Tonkin Highway.
- Additional northern circulating lane to the roundabout to accommodate two right turn lanes.

Figure 12: Perth Airport major upgrade proposals

7.3 GEH Upgrades

Transcore and the City met with Main Roads WA and requested the traffic projections for future years and the proposed upgrade plans for GEH.

Accordingly, Main Roads WA provided the below traffic projections for the regional road network and local distributor roads within the modelling study area (refer Appendix A):

- 2021 – Base network;
- 2036 – 2 scenarios (a four lane GEH at grade and a 6 lane GEH at grade) both assume that Kalamunda Road/ GEH Bypass is grade separated; and,
- 2051 – Ultimate assuming a grade-separated configuration for GEH featuring two lanes going under a trench along its entire length between Tonkin Highway and the GEH Bypass.

According to the advice provided by Main Roads WA, the GEH is set to be upgraded to six lanes by 2041 in this vicinity, with the possibility of a grade-separated configuration featuring two lanes going under a trench along its entire length between Tonkin Highway and the GEH Bypass. The proposed upgrades will include two interchanges at GEH/Coolgardie Avenue and GEH/Fauntleroy Avenue.

For the purpose of the 2041 microsimulation models, it is assumed that GEH will be upgraded to six lanes, but without any grade separation. All side roads connecting to GEH will operate as LILO intersections, while the main full-movement intersections will function as signalised intersections at GEH/Coolgardie Avenue and GEH/Fauntleroy Avenue.

To establish the 2041 traffic projections for GEH, reference was made to the Main Roads WA Regional Operations Model (ROM) projections. This involved interpolating the 2036 and 2051 traffic projections to derive the traffic volumes anticipated for the year 2036.

7.4 2041 modelling results

Transcore has coded the proposed upgrades on GEH and Dunreath Drive, as discussed in the previous sections. For the 2041 scenario and in order to provide a robust assessment, it was assumed that there will be no significant changes to the frequency or number of bus services, and all local roads will continue to operate under a 50 km/h speed limit, similar to the existing conditions. The 2041 demand matrices were updated based on the trip generation estimates for DA6 and the Perth Airport West Precinct and subsequently loaded onto the 2041 road network. A review of the VISSIM models for both AM (8:00-9:00) and PM (4:00-5:00) peak scenarios revealed significant congestion and gridlock on all distributor roads, including Dunreath Drive and Fauntleroy Avenue, as well as on most local roads (refer Figure 13).

The 2041 traffic projections on key distributor roads within the modelling study area during the peak hours are provided in Table 12. The traffic volumes projected for GEH are anticipated to exceed those reported in the table below. The VISSIM model was unable to load all traffic volumes from the established 2041 origin/destination matrix because of the excessive congestion and gridlock on GEH.

Furthermore, GEH, Dunreath Drive, and Fauntleroy Avenue serve as key routes for regional and Perth Airport traffic, leading to heavy usage. This situation is likely to result in significant "rat running" on Stanton Road, further exacerbating traffic congestion on that road. The cumulative effect of these factors indicates that the road network will face severe challenges in handling the anticipated traffic volumes in 2041.
The suggested road upgrades on GEH and Dunreath Drive as explained in above sections and coded in the 2041 VISSIM model are unlikely to be sufficient to manage the anticipated traffic increase. Given the significant projected traffic volumes, particularly from Perth Airport and regional traffic, these upgrades may not adequately address the congestion and capacity issues expected in the area. Without additional measures or more extensive improvements, the road network is at risk of becoming increasingly overburdened, leading to persistent congestion and safety concerns for all road users.

Table 12: 2041 traffic projections

Street	approach	2024 AM (8:00-9:00)	2024 PM (4:00-5:00)	2041 AM	2041 PM
Stanton Road	On the bridge	870	1054	1235	1819
Dunreath Dr	East of Tonkin High Way	1838	2464	2910	5645
GEH	West of Fauntleroy Avenue	3114	3602	3818	5205
Fauntleroy Ave	South of GEH	571	715	1551	3926

As a sensitivity analysis aimed at managing gridlock within the modelling study area for 2041, the traffic generation from the Perth Airport West Precinct was removed from the demand matrices. The sensitivity modelling conducted without the Perth Airport traffic still indicates congestion on GEH, as shown in Figure 14. However, it reveals satisfactory traffic operations on all local roads. Under this scenario, the projected traffic volumes on Stanton Road are estimated to be around 9,000 vpd during both the AM and PM peak hours. Additionally, the traffic projections on Dunreath Drive and Fauntleroy Avenue show a significant reduction without the Perth irport traffic, alleviating some of the congestion concerns associated with these routes.

Figure 13: Snap shot of VISSIM PM model – 2041 with Perth Airport West Precinct traffic generation

Figure 14: Snap shot of VISSIM PM model – 2041 without Perth Airport West Precinct traffic generation

7.5 Long term recommendations

Further Upgrades on GEH:

- Advocate significant road upgrades to increase capacity on GEH, including additional lanes where feasible and the installation of dedicated turning lanes at critical intersections.

- Advocate for key intersection upgrades along GEH to improve traffic flow and reduce congestion, focusing on high-traffic intersections that currently experience bottlenecks.

Optimization of Traffic Signals:

- Advocate to Main Roads WA for comprehensive review of the traffic signal timings on GEH to optimise flow, reduce delays, and minimise stop-and-go conditions. Implement adaptive traffic signal control systems that respond in real-time to traffic conditions.

Investigate Upgrades on Dunreath Drive and Fauntleroy Avenue:

- Advocate further upgrades on Dunreath Drive and Fauntleroy Avenue to enhance capacity and improve safety. This could include widening, implementing dedicated bike lanes, and improving pedestrian facilities.

Enhance Active Transport Infrastructure:

- Work with State Government to develop and expand pedestrian and cycling infrastructure, including dedicated bike lanes, pedestrian pathways, and safe crossing points. Promote active transport options to reduce reliance on vehicles and encourage sustainable travel.

Improve Public Transport Services:

- Advocate and enhance public transport services by increasing the frequency and reliability of bus and train services. Consider implementing new routes or expanding existing ones to better serve the community and reduce traffic congestion.

Investigate accessibility to GEH from Redcliffe Station Precinct:

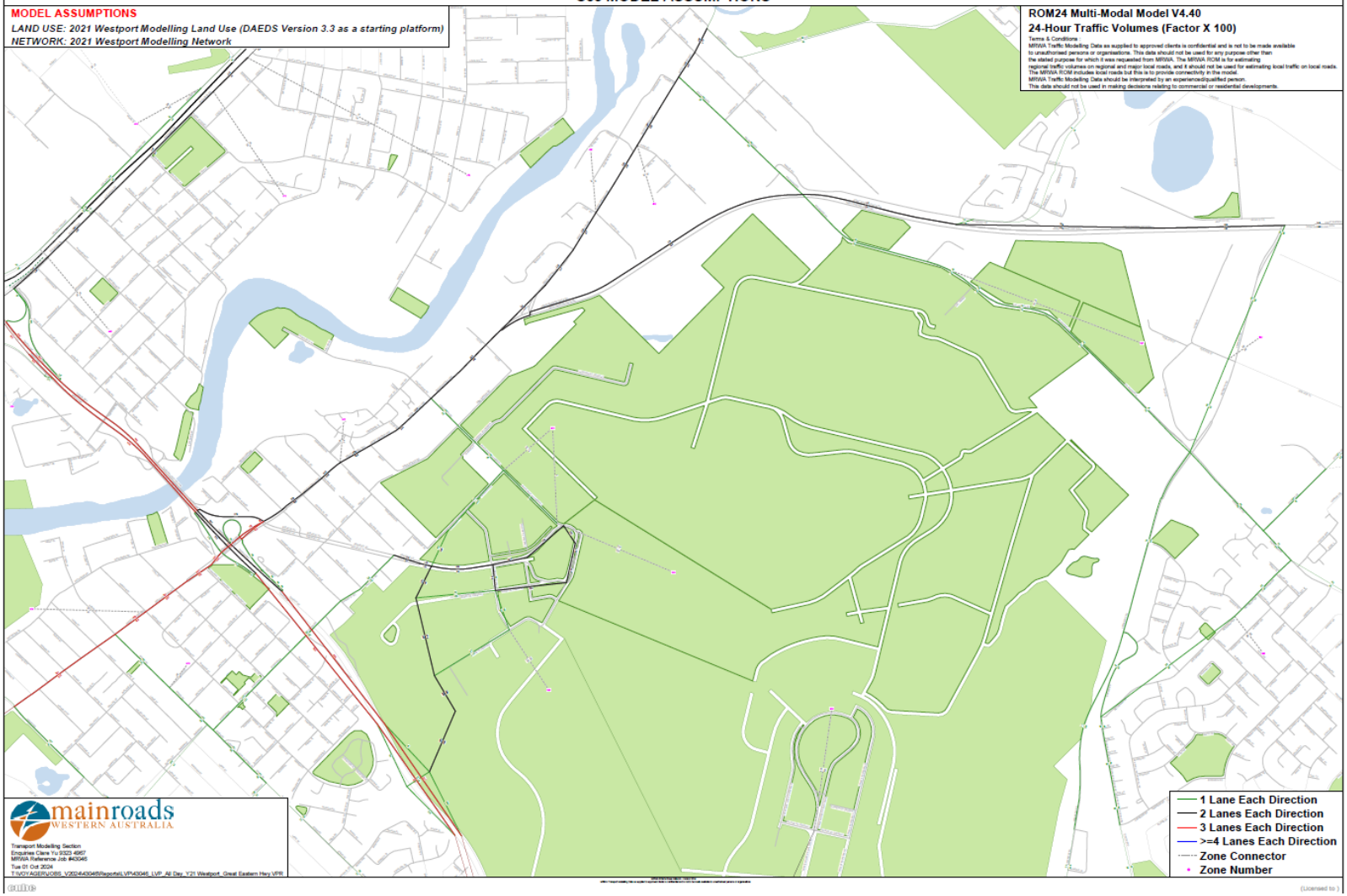
- Advocate for State Government to investigate direct access to GEH from Bulong Avenue and Central Avenue.

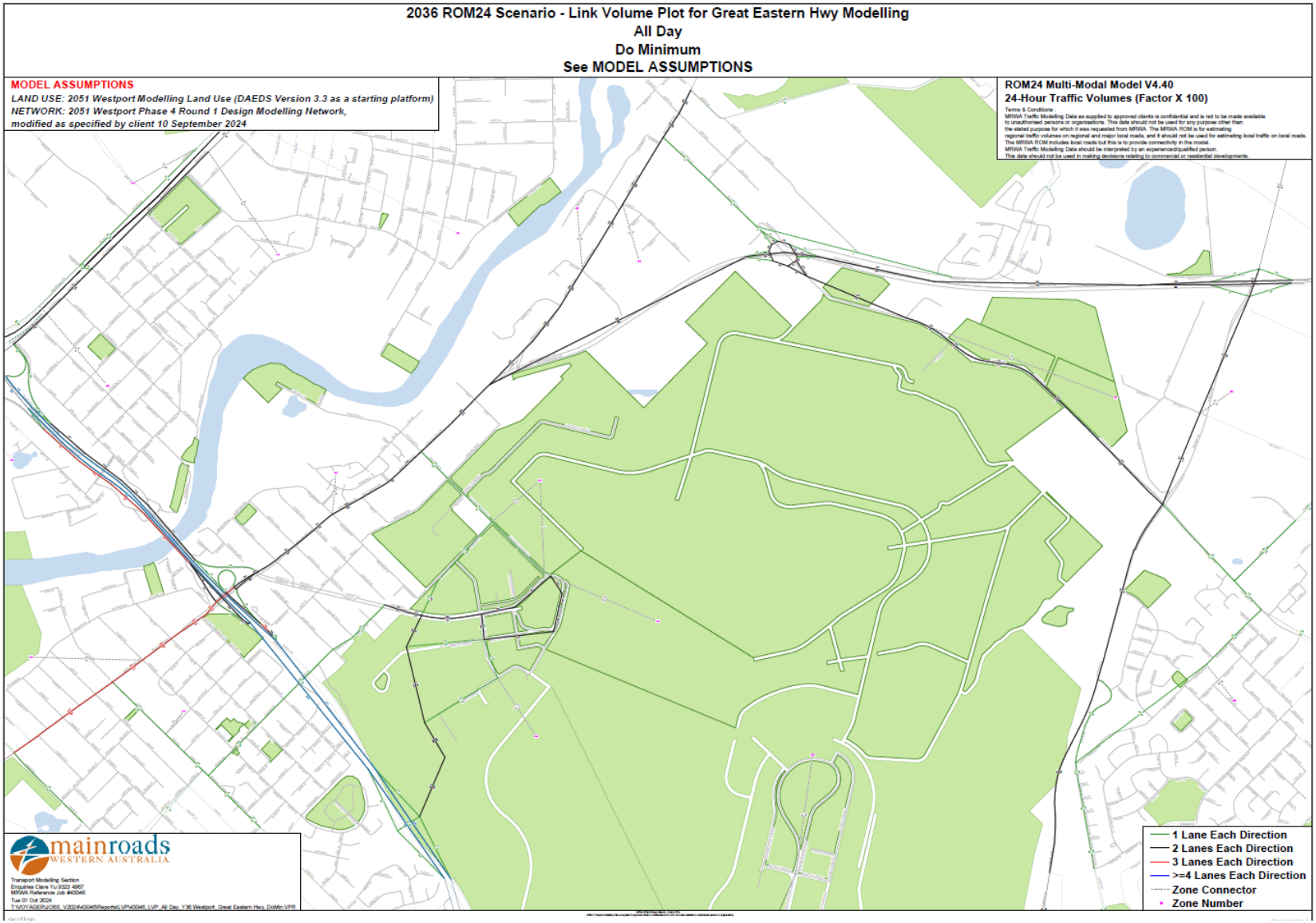
Appendix A

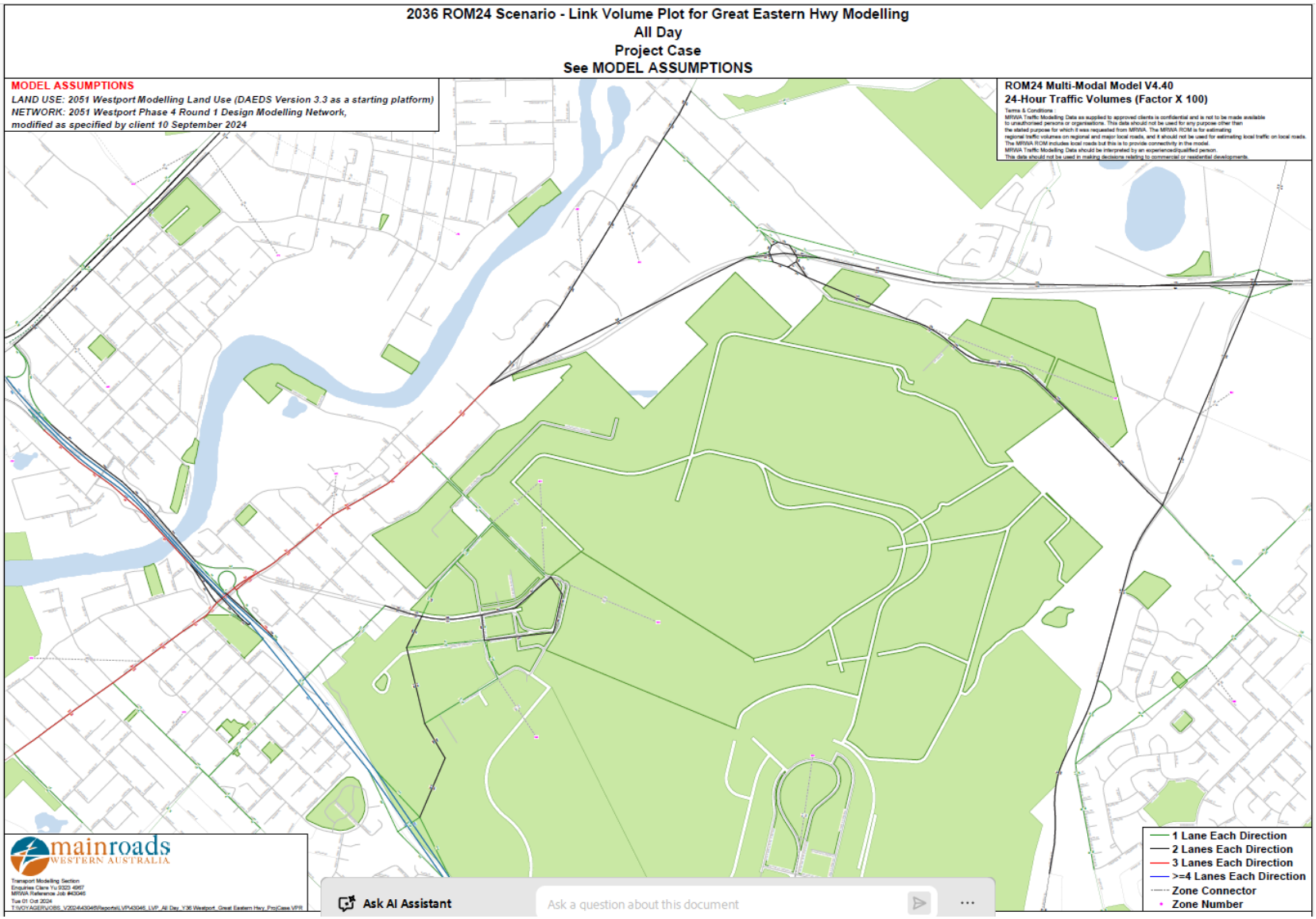
MAIN ROADS WA ROM TRAFFIC PROJECTIONS

Engineering a better future for over 20 years!

2021 ROM24 Scenario - Link Volume Plot for Great Eastern Hwy Modelling
All Day
See MODEL ASSUMPTIONS




2036 ROM24 Scenario - Link Volume Plot for Great Eastern Hwy Modelling
All Day
Do Minimum
See MODEL ASSUMPTIONS
MODEL ASSUMPTIONS
LAND USE: 2051 Westport Modelling Land Use (DAEDS Version 3.3 as a starting platform)
NETWORK: 2051 Westport Phase 4 Round 1 Design Modelling Network,
modified as specified by client 10 September 2024
ROM24 Multi-Modal Model V4.40
24-Hour Traffic Volumes (Factor X 100)
mainroads
WESTERN AUSTRALIA
1 Lane Each Direction
2 Lanes Each Direction
3 Lanes Each Direction
>=4 Lanes Each Direction
Zone Connector
Zone Number


2036 ROM24 Scenario - Link Volume Plot for Great Eastern Hwy Modelling
All Day
Project Case
See MODEL ASSUMPTIONS
MODEL ASSUMPTIONS
LAND USE: 2051 Westport Modelling Land Use (DAEDS Version 3.3 as a starting platform)
NETWORK: 2051 Westport Phase 4 Round 1 Design Modelling Network,
modified as specified by client 10 September 2024
ROM24 Multi-Modal Model V4.40
24-Hour Traffic Volumes (Factor X 100)
mainroads
WESTERN AUSTRALIA
1 Lane Each Direction
2 Lanes Each Direction
3 Lanes Each Direction
>=4 Lanes Each Direction
Zone Connector
Zone Number
Ask AI Assistant
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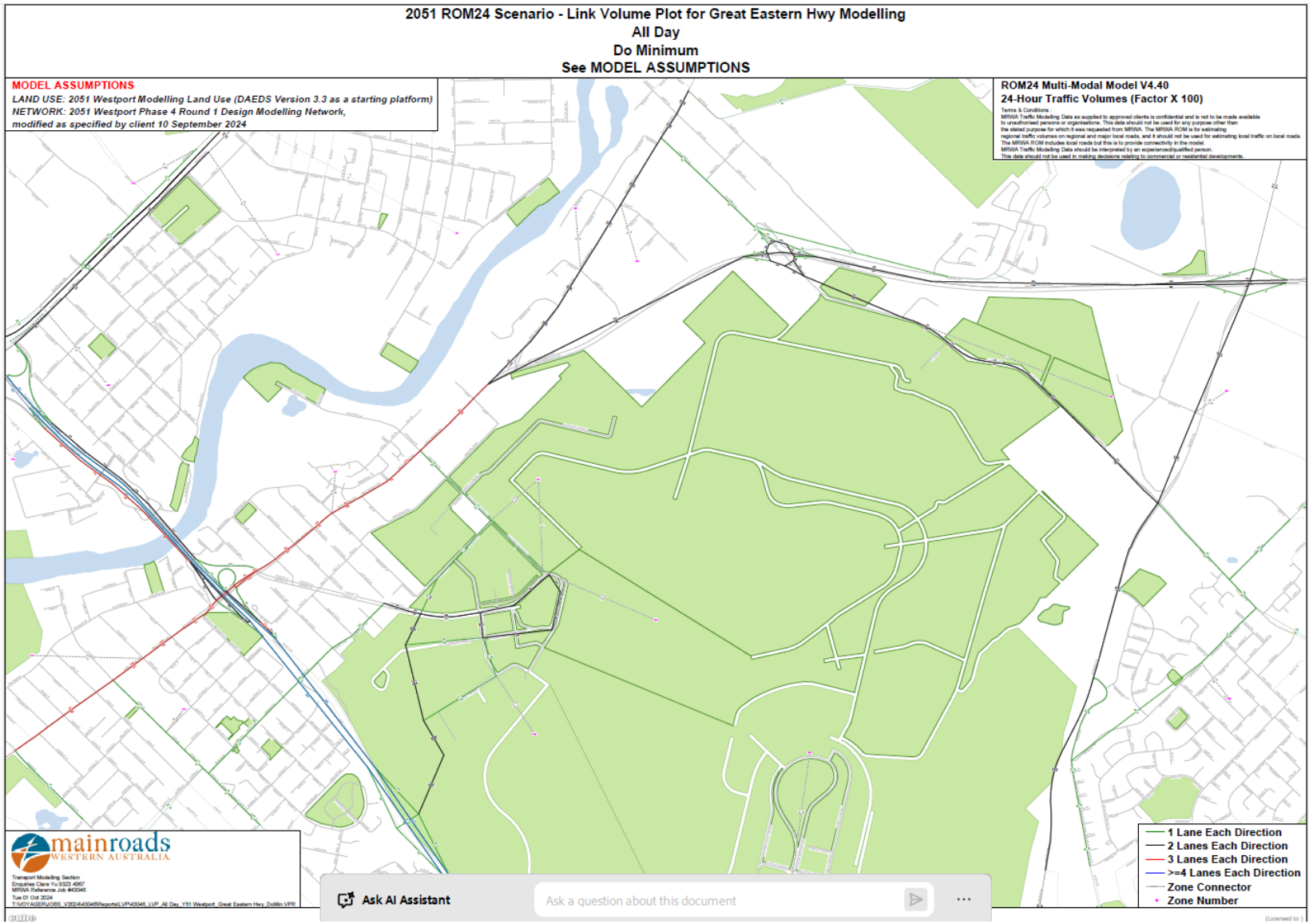
2051 ROM24 Scenario - Link Volume Plot for Great Eastern Hwy Modelling
All Day
Do Minimum
See MODEL ASSUMPTIONS
MODEL ASSUMPTIONS
LAND USE: 2051 Westport Modelling Land Use (DAEDS Version 3.3 as a starting platform)
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